

PRESIDIO OF SAN FRANCISCO



VEGETATION MANAGEMENT PLAN AND ENVIRONMENTAL ASSESSMENT

DECEMBER 2001

GOLDEN GATE NATIONAL RECREATION AREA
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE
THE PRESIDIO TRUST

SUMMARY

The Vegetation Management Plan (VMP) and Environmental Assessment (EA) for the Presidio of San Francisco is a collaborative planning effort between the National Park Service (NPS) and the Trust (Trust), the two agencies that share land management responsibilities for the Presidio, part of Golden Gate National Recreation Area (GGNRA). The VMP and EA conform to the requirements of the National Environmental Policy Act (NEPA) and tier from the Presidio General Management Plan Amendment (GMPA) and Environmental Impact Statement (EIS) completed in 1994. The scope of this plan addresses all vegetation within the Presidio — both native plants and species introduced as landscaping. The native plant communities, diminished in size and rare within San Francisco, contain important habitat for a relatively large number of rare and endangered plant species. Historic landscape plantings and a historic forest are the result of significant design efforts and afforestation by the U.S. Army from the 1880s into the 1940s.

This plan has been developed to guide the NPS and the Trust in the management of vegetation resources at the Presidio. The vegetation resources have both natural and historical significance; both aspects will be protected and enhanced. Central to the plan is the development of sustainable and enduring vegetation that can be managed with less maintenance effort than is currently required, with increased resource sensitivity, and using natural processes whenever possible.

A vegetation management zoning map has been developed as the basis for future actions within three vegetation categories: native plant communities, historic forest, and landscape vegetation. The Selected Alternative for the VMP (a modification of the VMP and EA (1999) Alternative 1) directs the following management of Presidio vegetation resources:

- Native plant communities will be enhanced and restored and non-native trees outside of the historic forest and other non-native plants that have invaded native habitat will be removed over time. Habitat for thirteen special-status plants will be protected and enhanced.
- The historic forest, which is beginning to decline as it ages, will gradually be rehabilitated as tree falls and openings created by storms provide opportunities for tree replacement. A Historic Forest Characterization and Treatment Study (Historic Forest Study) will determine appropriate treatments, considering both ecological and historic values. Guided by the Historic Forest Study, forest management strategies and treatments will consider the extent to which a more age- and species-diverse forest can be achieved while maintaining the unique forest characteristics that contribute to the National Historic Landmark status of the Presidio. . Other recommended actions will restore and maintain scenic vistas, preserve key historic forest stands, control erosion problems, treat trees that present hazards to visitors or property, and convert a topped Monterey cypress forest to lower growing species.
- Historic plantings and landscape character will be maintained and enhanced in landscape vegetation management zones. When replacement planting is necessary, use of new plant materials will consider potential threats to native plants from hybridization and invasive tendencies.

Implementation of the VMP will result in a vegetation mosaic of native plant communities, historic forest, and landscape vegetation, and will increase species and habitat diversity in the Presidio. The VMP requires a committed, long-term management effort, and ongoing public involvement, as well as periodic monitoring and evaluation to continue to maintain the Presidio's complex vegetation mosaic.

Environmental consequences of the Selected Alternative (Alternative 1) and three additional alternatives (Alternative 2: No Action, Alternative 3: Selective Forest Cuts, and Alternative 4: Increase Tree

Diversity) are analyzed in the EA as required by NEPA. Impacts of the Selected Alternative will be beneficial to native vegetation and wildlife and will provide for the continuation of significant historic landscape resources that might otherwise deteriorate over time.

The VMP and EA were released for public review on July 1, 1999 following a nearly two year period of public involvement through newsletters, field visits, meetings, workshops and presentations to neighbors, tenants, the GGNRA Advisory Commission and other agencies. Public comment was accepted over a 4.5 month period, and presentations and oral comments were heard before the GGNRA Advisory Commission and the Trust Board. Comments were received from 478 agencies, organizations, and individuals. At the close of the formal comment period on November 18, 1999, NPS and Trust staff considered public and agency comment and recommended certain refinements to the document in response to the comments received. These modifications were presented as recommendations by staff to the public through meetings of the GGNRA Advisory Commission, the Trust Board and neighborhood groups.

The primary issues raised during the 4.5 month comment and response period on the VMP and EA (1999) were concerns about the size of the vegetation zones ; the balance between the zones; and the treatments proposed for each zone, often reflecting the intrinsic and often conflicting values that individual viewers place on the cultural forest and native plant communities. In response to these concerns, modifications have been made to the document and plan. The Finding Of No Significant Impact (FONSI) (see attachment E) addresses in more detail the principal issues raised by public comments, agency response and, where indicated, resultant clarifications and modifications made to the Final VMP and EA.

This Final VMP and EA is a revision of the VMP and EA (1999). Text has been added to provide necessary clarification or to incorporate the modifications made to the document following consideration of public and agency comment. The NPS and the Trust collaborated in the preparation of the EA, as each agency has separate jurisdictional responsibilities in the Presidio. The NPS initiated the National Environmental Policy Act (NEPA) process, and has acted as lead agency in the preparation of the VMP and EA. The Trust assumed the role of a cooperating agency under NEPA following the transfer of jurisdiction of Area B of the Presidio from the NPS to the Trust on July 8, 1998. As a cooperating agency with jurisdictional authority, the Trust has independent legal responsibilities with respect to NEPA compliance. The NPS and the Trust collaborated on presenting the VMP to the public, soliciting and considering public comment and designating a Selected Alternative for the VMP. The NPS and Trust prepared jointly signed FONSI on the VMP and EA that will apply to actions of and satisfy the independent legal responsibilities under NEPA. Future site-specific vegetation management plans proposed by the NPS and the Trust will be reviewed for conformance with the VMP and FONSI. This Final VMP and EA and VMP FONSI comprises the NEPA record for the VMP.

TABLE OF CONTENTS

SUMMARY i

1. INTRODUCTION..... 1

2. PURPOSE AND NEED 7

 2.1 Planning for the Presidio..... 7

 2.2 Building on the GMPA 7

 2.5 General Management Plan Amendment Primary Objectives 9

 2.6 Planning Issues Raised..... 10

 2.7 Regulatory Compliance Requirements 12

 2.7.1 Related Documents and Plans..... 13

 2.8 Summary of the Scoping Process..... 15

3. VEGETATION MANAGEMENT PLAN 17

 3.1 Vegetation Management Zoning Overview 17

 3.2 Native Plant Communities Zone 18

 3.2.1 Description of Native Plant Communities 18

 3.2.2 Proposed Management Actions 31

 3.3 Historic Forest Management Zone..... 42

 3.3.1 Description of Historic Forest..... 42

 3.3.2 Proposed Management Actions 47

 3.4 Landscape Vegetation Management Zone 60

 3.4.1 Description of Landscape Vegetation 60

 3.4.2 Landscape Vegetation Management Categories 61

 3.4.3 Proposed Management Actions 63

 3.5 Soil Erosion And Control..... 69

 3.5.1 Description..... 69

 3.5.2 Proposed Management Actions 70

 3.6 Fire Management 70

 3.6.1 Existing Policies..... 70

 3.6.2 Proposed Management Actions 71

 3.6.3 Implementation Strategy 71

4. DESCRIPTION OF PROJECT ALTERNATIVES 74

 4.1 Alternative 1: Proposed Actions 74

 4.2 Alternative 2: No Action..... 75

 4.3 Alternative 3: Selective Forest Cuts..... 76

 4.4 Alternative 4: Increase Tree Diversity 76

 4.5 Alternatives Considered but Rejected..... 77

 4.5.1 Replace Tree Species in the Historic Forest Management Zone with Native Trees..... 78

 4.5.2 Restore Open Space Areas (Outside of Landscape Vegetation Management Zone) with Native Plant Communities..... 78

 4.5.3 Rehabilitate the Historic Forest Using Large Block Cuts..... 78

 4.6 Mitigation Measures for Environmental Protection Incorporated into the Selected Alternative..... 79

| | | |
|-------|--|-----|
| 5. | AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES | 90 |
| 5.1 | Physical Resources | 90 |
| 5.1.1 | Affected Environment | 90 |
| 5.1.2 | Impact Assessment | 90 |
| 5.2 | Native Plant Communities..... | 91 |
| 5.2.1 | Affected Environment | 91 |
| 5.2.2 | Impact Assessment | 92 |
| 5.3 | Wildlife Resources | 94 |
| 5.3.1 | Affected Environment | 94 |
| 5.3.2 | Impact Assessment | 95 |
| 5.4 | Historic Forest and Cultural Resources | 97 |
| 5.4.1 | Affected Environment | 97 |
| 5.4.2 | Impact Assessment | 97 |
| 5.5 | Visual Resources | 100 |
| 5.5.1 | Affected Environment | 100 |
| 5.5.2 | Impact Assessment | 100 |
| 5.6 | Visitors and Area Residents | 102 |
| 5.6.1 | Affected Environment | 102 |
| 5.6.2 | Impact Assessment | 102 |
| 5.7 | Cumulative Impacts..... | 103 |
| 5.7.1 | Alternative 1, Alternative 3, and Alternative 4 | 103 |
| 5.7.2 | Alternative 2..... | 104 |
| 6. | CONSULTATION AND COORDINATION..... | 105 |
| 6.1 | Preparers..... | 105 |
| 6.2 | Contributors..... | 105 |
| 7. | REFERENCES..... | 107 |

APPENDICES

- Appendix A. Definitions
- Appendix B. Sustainable Practices at the Presidio
- Appendix C. Plant Selection Lists
- Appendix D. Photo Simulations of Visual Resource Impacts
- Appendix E. VMP Finding of No Significant Impact (FONSI)

FIGURES

| | |
|--|----|
| Figure 1 – The Region..... | 3 |
| Figure 2 – Presidio Place Names | 5 |
| Figure 3 – Vegetation Management Plan Zoning Map for the Presidio..... | 21 |
| Figure 3A – Special Management Zone for the Presidio..... | 23 |
| Figure 4 – Probable Presidio Native Vegetation Prior To European Settlement..... | 25 |
| Figure 5 – Existing Presidio Native Plant Communities | 27 |
| Figure 6 – Historic Forest Boundary | 43 |
| Figure 7 – Viewpoints and Vistas to be Restored..... | 57 |

TABLES

Table 1 Special-Status Plant Species in the Presidio 32
Table 2 Tree Species Potentially Suitable to Supplement Current Forest Species 77

ACRONYMS

| | |
|-------|--|
| BMP | Best Management Practice |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| FEIS | Final Environmental Impact Statement |
| FONSI | Finding Of No Significant Impact |
| GGNRA | Golden Gate National Recreation Area |
| GMPA | General Management Plan Amendment |
| HFCTS | Historic Forest Characterization and Treatment Study |
| NEPA | National Environmental Policy Act |
| NHL | National Historic Landmark |
| NHPA | National Historic Preservation Act |
| NPS | National Park Service |
| PA | Programmatic Agreement |
| PTIP | Presidio Trust Implementation Plan |
| ROD | Record of Decision |
| SEA | Special Ecological Area |
| USFWS | U.S. Fish and Wildlife Service |
| VMP | Vegetation Management Plan |

1. INTRODUCTION

The Presidio of San Francisco lies at the northern tip of the San Francisco Peninsula on the Golden Gate at the point where San Francisco Bay empties into the Pacific Ocean. For the residents of San Francisco and the 7 million inhabitants of the nine Bay Area counties, the 1,480-acre former military post is both a forested refuge and cultural landmark amid a densely urbanized setting.

The Presidio was included within the boundaries of Golden Gate National Recreation Area (GGNRA) when Congress created the park in 1972. The U.S. Army turned over the management of the Presidio to the National Park Service (NPS) in 1994 as part of the Base Realignment and Closure Act of 1989. Since the inception of the Presidio Trust (Trust) in July 1998, the Trust has managed the interior portion of the Presidio and the National Park Service (NPS) has managed the coastal areas. Other units of the GGNRA, also former military holdings such as Fort Baker and the Marin Headlands, are located just opposite the Presidio on the north shore of the Golden Gate, connected by one of the world's most famous landmarks, the Golden Gate Bridge (see Figure 1, The Region, and Figure 2, Presidio Place Names).

The Presidio was used continuously as a military garrison for 220 years and is unique among U.S. Army posts in that it contains artifacts and buildings from the Mexican-American War of 1848 to the very recent past, as well as from earlier occupation by Spain and Mexico. The outstanding historic significance of the Presidio is recognized by its designation in 1962 as a National Historic Landmark on the National Register of Historic Places. More than 500 of the 870 buildings within the Presidio are listed as contributing to the significance of the landmark district.

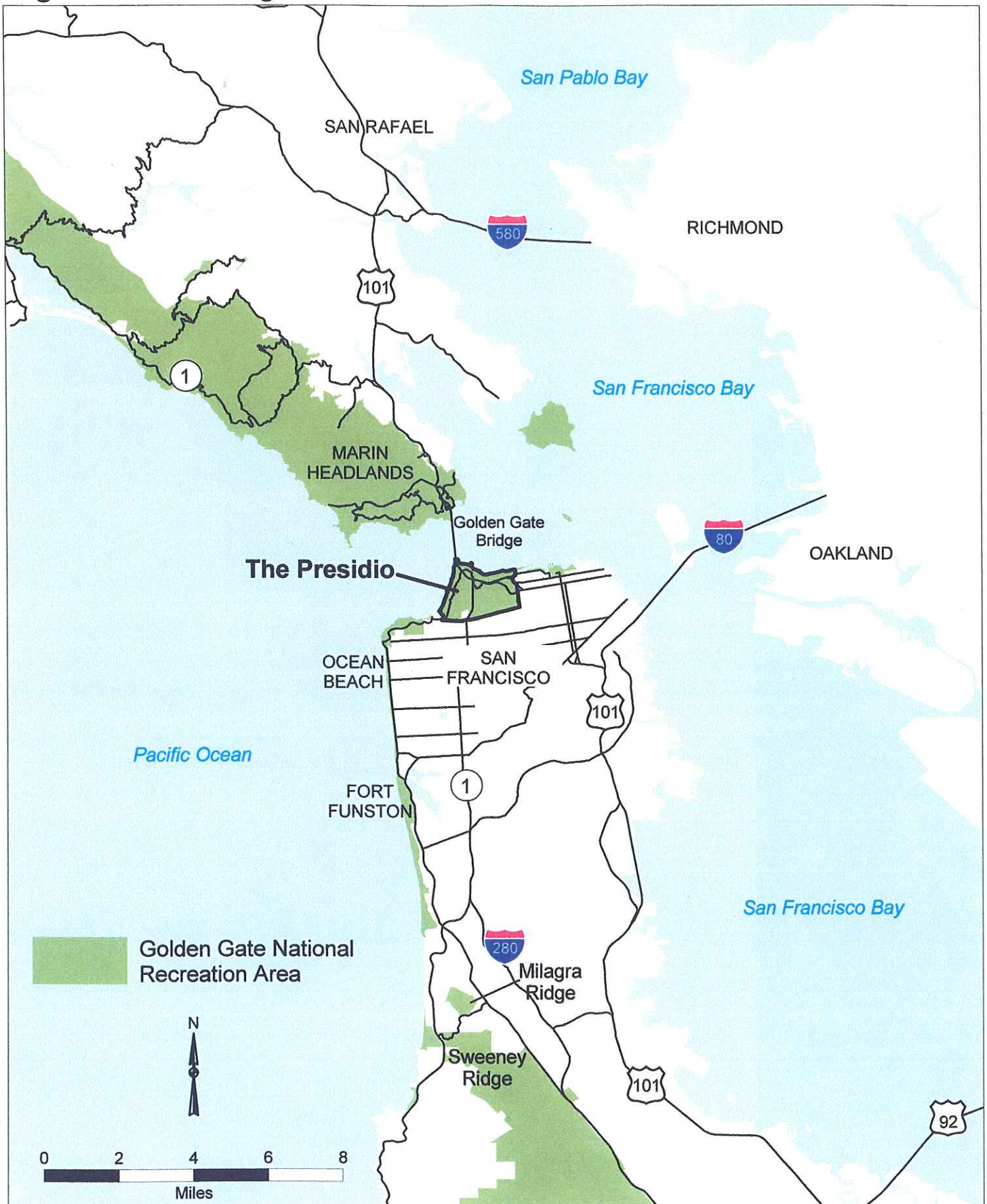
The native and planted vegetation of the Presidio is the product of both natural processes and human occupation and alterations. Prior to the settlement of the area by Europeans, the area now known as the Presidio consisted of sweeps of dunes, coastal marshes, and serpentine rocks dominated by grasses and shrubs, with trees found in the sheltered valleys and leeward hillsides. Remnant natural areas within the Presidio contain some of the last remaining examples of San Francisco's once extensive dune and serpentine native plant communities, as well as habitat for thirteen rare and endangered plant species.

Landscape plantings in developed areas and a historic planted forest provide a distinctive setting for the military post. The historic forest began as an ambitious Army beautification project conceived in the 1880s by Army Major W. A. Jones. The intent of his original plan was to plant trees to crown the ridges, border the boundary fences, and cover major areas of sand and marsh waste with a forest "that was to seem continuous and thus appear immensely larger than it really is" and provide a "contrast from the city."

The original planted trees, now over 100 years old, have matured into an extensive forest composed primarily of Monterey pine, Monterey cypress, and eucalyptus trees, that is a significant landscape feature of the Presidio and San Francisco as well as a refuge for people seeking fresh air, solitude, and recreation. The open space of the Presidio is a mosaic of natural and historic landscapes. The natural areas containing some of the last remaining examples of San Francisco's native plant communities are threatened by the growth of recreational use and the continued colonization of non-native plants. Much of the Presidio historic forest, especially the cypress and Monterey pine stands, is in a serious state of decline (Jones & Stokes Associates, Inc. 1997). Historic viewsheds have been blocked by mature trees or cleared by unsightly tree-topping. As historic structures are leased for adaptive uses, the horticultural landscape needs to be restored in a manner consistent with the Presidio status as a National Historic Landmark.

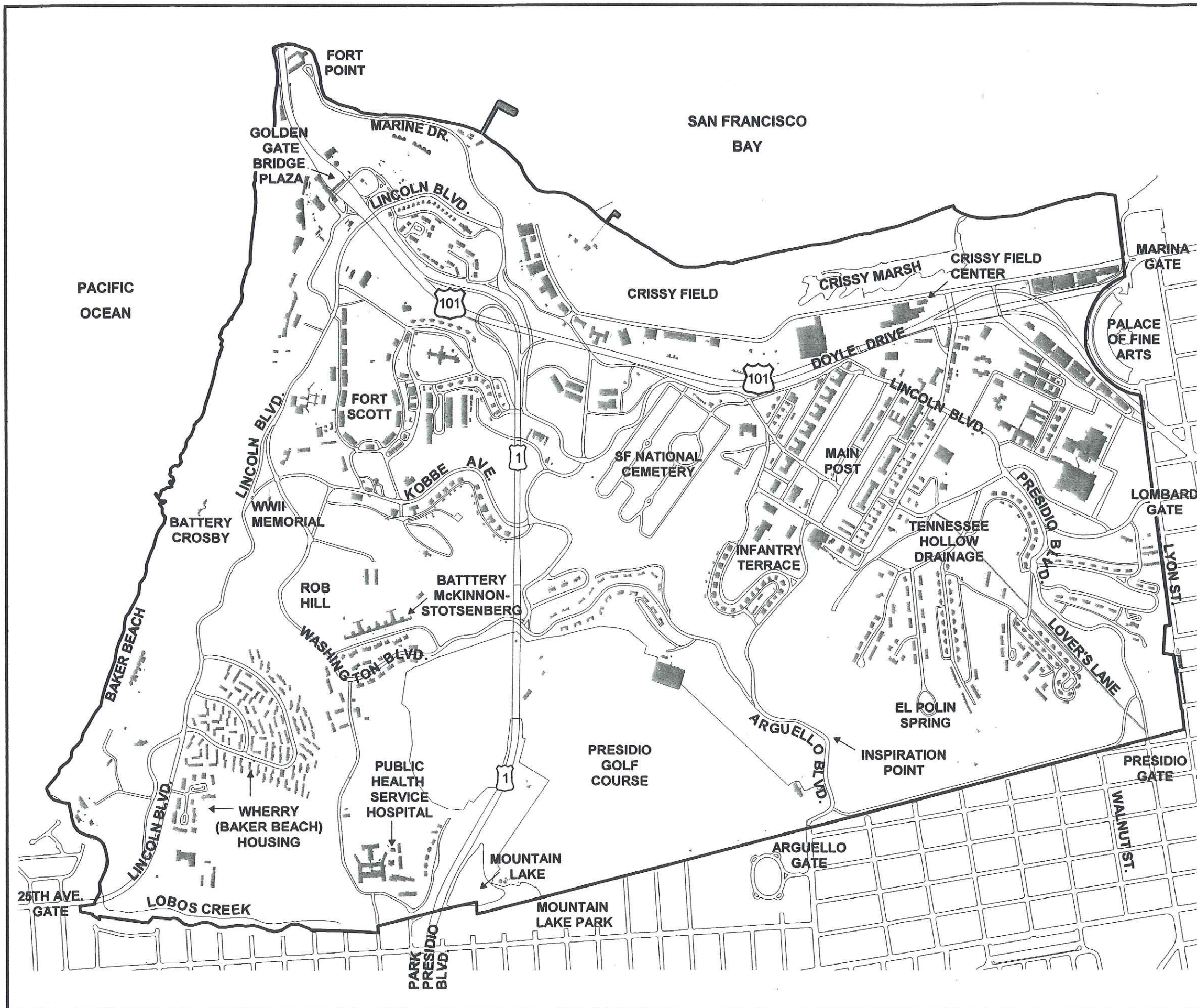
This Vegetation Management Plan (VMP) for the Presidio of San Francisco was developed in the context of these existing concerns and with a view to the future stewardship of this national park.

Figure 1. The Region



December 2001

Figure 2. Presidio Placenames



Source: NPS, Presidio Trust, 2001.



SCALE APPROX 1:12000

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FEET

2. PURPOSE AND NEED

2.1 PLANNING FOR THE PRESIDIO

The legislation that created the Golden Gate National Recreation Area in 1972 included a proviso that would bring the Presidio of San Francisco under the jurisdiction of the National Park Service if it were determined by the Department of Defense to be excess to its needs. The Presidio was listed for closure under the Base Realignment and Closure Act in 1989. Management of the 1,480-acre Presidio was officially transferred from the U.S. Army to the NPS in October 1994, to be managed as part of GGNRA.

The Presidio is currently managed by two agencies: the National Park Service and the Trust. The NPS manages the northern and western perimeter of the Presidio as a portion of GGNRA (Area A of the Presidio). The Trust, established in 1996 by (Public Law 104-333), assumed jurisdiction and management of the remaining 1,168 acres of the Presidio on July 8, 1998 (Area B of the Presidio).

A planning effort to define future use of the Presidio was initiated by GGNRA in the early 1990s. After data gathering, analysis and public input, this effort produced the 1994 Final General Management Plan Amendment (GMPA) for the Presidio that identified objectives, uses and implementation strategies that would guide management and use of this portion of GGNRA.

An Environmental Impact Statement (EIS) was prepared for the GMPA, in compliance with the National Environmental Policy Act (NEPA), which addressed potentially significant impacts from the proposed GMPA and from a range of alternative management plans. Where potentially significant effects were identified, mitigation measures were developed that would effectively reduce the potential impact to a less-than-significant level.

The GMPA (NPS, 1994a) required the preparation of a Presidio forest management plan to reduce the potential for adverse impacts from implementation of the GMPA on the National Historic Landmark District status of the Presidio. The GMPA EIS (NPS, 1994b) also called for the restoration and expansion of native plant communities, protection of all rare plants and plant communities, removal of some areas of forest which have spread from the historic forest boundary, reestablishment of historic vistas, rehabilitation of historic landscape plantings, removal of exotic pest plant species, and protection of important wildlife habitat. A comprehensive Vegetation Management Plan was determined to be the appropriate vehicle for addressing these related programs in the Presidio.

At present, GGNRA and the Trust manage the Presidio in accordance with the GMPA. In 2000, the Trust began a planning effort to update the GMPA for Area B -- the portion of the Presidio within its jurisdiction. This update, the Presidio Trust Implementation Plan (PTIP), will incorporate the VMP by reference (see VMP Section 2-8, Concurrent Plans). Should the PTIP result in land use changes that indicate the need for an adjustment to vegetation management zoning or treatment recommendations, the VMP would be amended through the PTIP process. Further changes to the VMP zoning would be addressed and reviewed through future site-specific planning, with the appropriate level of historic and environmental review.

2.2 BUILDING ON THE GMPA

The GMPA recognized the Presidio forest as a significant cultural landscape feature, not only of the Presidio but of San Francisco as a whole. The GMPA recognized that the historic forest was aging and in need of rehabilitation and replanting. The extent of the Presidio forest had changed over the past fifty years, spreading beyond the boundaries of the original plantings in some areas and

vanishing from others. The GMPA called for the identification of a baseline historic forest boundary that would better define this cultural landscape feature of the Presidio and allow for the re-establishment and more systematic maintenance of historic viewsheds both from within the Presidio and from adjacent neighborhoods.

Due to the clustered development by the U.S. Army, the Presidio still provides habitat for several isolated, remnant native plant communities, such as riparian woodland and coastal scrub, which were formerly widespread throughout San Francisco but are now greatly reduced in acreage. Within these communities are plant species now considered under threat, as evidenced by their listing under the Federal Endangered Species Act or by the more comprehensive lists published by the California Native Plant Society. The GMPA recognized the vital need to provide protection, restoration, and expansion opportunities for these special-status plants and native plant communities.

2.3 NEED FOR THE VEGETATION MANAGEMENT PLAN

The need for a vegetation resource planning document was identified in several mitigation measures in the GMPA EIS (NPS 1994b). The mitigation measures called for a series of park-wide vegetation resource planning efforts that would address the range of vegetation management issues in the Presidio. To be considered effective mitigation, this VMP must not only address potentially adverse impacts that could result from future actions identified in the GMPA (such as the leasing or removal of buildings), but develop an effective park-wide strategy that will improve upon the current condition of vegetation resources in the Presidio. The VMP is based on the following directives from the GMPA:

Additional research would be conducted to determine the evolution of the forest and its existing conditions, and a forest management plan with an environmental assessment would be prepared to guide future actions. This plan would identify appropriate replacement species, tree stand management options, and exact areas for non-historic forest removal. Historic trees that have become hazardous would be documented for the historic record before removal. (NPS 1994b, p. 29)

A Presidio-wide inventory and monitoring program for rare and endangered plant and animal species would be established. . . the results of the survey would be used to establish management objectives for each rare and endangered species, including definitions of acceptable population levels in accordance with NPS-77 (NPS 1991). These objectives would stipulate actions and techniques for protection, enhancement and restoration of each species. (NPS 1994b, p. 31)

Preserve the uniqueness and unity of Presidio site features; retain the symbols and traditions that provide a link to its past. (GMPA, p. 33)

The landscape and historic features that define the site's unique character will be preserved and rehabilitated for park use (NPS 1994a, p. 32).

2.4 PURPOSE OF THE VEGETATION MANAGEMENT PLAN

The purpose of the VMP is to provide a management framework for protecting, enhancing, restoring, and rehabilitating the native and planted vegetation of the Presidio. The VMP will guide the actions affecting the vegetation resources of the Presidio.

The Presidio GMPA delineated "A View of the Future" that mirrors the purposes for which Congress established the Golden Gate National Recreation Area: "the Presidio will have all the exceptional

qualities of a traditional national park-- it will be a place for recreation and solitude as well as an urban refuge devoted to the preservation of the extraordinary cultural, natural, and scenic resources that make it one of the most beautiful locations on earth" (NPS 1994a, p. 20). This VMP is a guide for managing the Presidio's natural and cultural vegetation in furtherance of these purposes.

The VMP establishes three broadly defined vegetation management zones for the Presidio, develops goals, objectives, and strategies for each, and defines the baseline extent of the most visible cultural landscape feature of the Presidio — the historic forest. The guidance provided by the VMP would reduce the potential for adverse impacts to park resources and establish a framework for a coordinated management effort in rehabilitating and restoring the native plant, historic forest, and landscaped areas of the park.

The GMPA established 13 planning areas within the Presidio. Taken together, these planning areas contain a balance of developed and open space areas to be managed in ways that are compatible with park purposes and adjacent neighborhood development, and that offer visitors a diversity of experiences and opportunities. One or more of the three categories of Presidio vegetation — native plant communities, historic forest, and landscape vegetation — are present within each of the GMPA planning areas.

2.5 GENERAL MANAGEMENT PLAN AMENDMENT PRIMARY OBJECTIVES

Native Plant Communities

- *Continue the Presidio-wide inventory and monitoring program for rare and endangered plant species and develop management objectives that stipulate actions and techniques for protection, enhancement and restoration of each species.*
- *Protect the remaining native plant communities in the Presidio.*
- *Restore and increase the area of native plant communities in the Presidio. Use local Presidio plants for plantings whenever possible. Replant areas where forest is removed with native vegetation.*

Historic Forest

- *Restore and rehabilitate the historic forest within its historical boundaries, manage it as part of the cultural landscape, and maintain the regional visual quality of the Presidio.*
- *Identify the tree replacement species, tree stand management actions, and areas for non-historic forest removal.*
- *Restore historic vistas and reestablish historic linkages between areas of the Presidio by clearing selected non-historic forested areas.*

Landscape Vegetation

- *Design and site new landscaping elements in keeping with the historic character-defining elements of the National Historic Landmark while allowing changes to occur that will maintain the vitality of the site.*
- *Confine non-native species to those areas where they were historically planted and are considered important to cultural landscape values.*

- *Encourage use of non-invasive, drought-tolerant, low-maintenance landscaping.*

Presidio-Wide Objectives

- *Increase open space to enhance park values and improve the Presidio's natural and recreational qualities.*
- *Identify and protect sensitive wildlife species, and restore and maintain their habitats.*
- *Manage onsite water resources to protect groundwater and surface water resources and natural wetland and riparian values and to efficiently supply water to the Presidio community.*

Sustainable Design and Conservation

- *Adopt the principles of sustainable design and technology when upgrading the built environment.*
- *Promote and demonstrate conservation practices, including energy conservation, water conservation, and waste reduction and recycling. Use reclaimed water wherever possible.*
- *Ensure that the Presidio utilizes integrated pest management control methods and minimizes the use of pesticides and herbicides.*

2.6 PLANNING ISSUES RAISED

The following vegetation management issues were: 1) included in the GMPA or GMPA EIS or both; 2) gathered during public scoping for this VMP; or 3) identified by NPS staff through research for this Vegetation Management Plan. The planning issues demonstrate the broad scope of the VMP and present background information needed to understand the context in which the VMP has been developed.

Impacts to Physical Resources

Soil Erosion Is a Threat to Native Vegetation and the Historic Forest. Visitor foot traffic and improper drainage have resulted in erosion and gulying in several areas. In some forested areas, soil characteristics have changed such that dramatically less water infiltrates into normally porous sand, and rill and gully erosion have occurred. Corrective actions need to be identified and implemented to protect resources and maintain accessibility for urban visitors.

Impacts to Native Plant Communities

Existing Native Plant Communities in the Presidio Require Protection and Enhancement.

Native plant communities, rare in San Francisco and found in small areas within the Presidio, are critically threatened by lack of habitat and must be protected.

Rare and Endangered Species Require Protection. Many small natural areas contain populations of rare and endangered species that must be protected and enhanced in order for the rare species to survive.

Native Plant Communities Can Be Expanded. Many opportunities are available in the Presidio to reintroduce native plant communities to areas where non-native plants have become established and where non-historic development would be removed as part of the GMPA.

Introduced Horticultural Plants and Aggressive Non-native Species Require Management.

Some non-native plant species can aggressively spread to areas where they can displace native species or threaten their genetic integrity through cross-pollination.

Impacts to Wildlife Resources

Presidio Plant Communities Provide Important Wildlife Habitat. Vegetation management efforts should avoid impacts to wildlife such as nesting birds or aquatic species in riparian corridors.

Impacts to the Historic Forest and Cultural Resources

The Historic Forest of the Presidio Is in an Advanced Stage of Maturity. As a significant feature of the historic landscape, the forest is a major contributing element to the National Historic Landmark status of the Presidio. The forest is in a state of decline because some tree species are not long-lived, and thinning and other horticultural needs have been neglected. The forest demonstrates reduced vigor, and its composition and visual appearance are changing. Selection of species for replanting and specific forest treatment strategies have generated much public interest and require ongoing assessment and evaluation.

Forest Boundaries Have Shifted Over Time. Trees in the historic forest have reseeded and expanded beyond the original planted areas. Trees have invaded natural areas along the coastal bluffs and in the Inspiration Point area. In other areas, historic plantings have been lost. These areas provide opportunities for restoration of native plant communities, replanting of forest trees or reestablishment of views.

Pest and Disease Potential Requires Evaluation and Monitoring. Pine pitch canker (a fungus) and the eucalyptus longhorn borer (a pest insect) pose potential threats to the Presidio forest. If these pests infect Presidio trees, significant loss of Monterey pine and eucalyptus could occur. An integrated pest management plan may need to be developed if monitoring indicates expansion into the Presidio.

Horticultural Plantings Throughout the Presidio Need to Be Rehabilitated. Non-native horticulture plant species often have historical significance because of their association with past military development and uses. Many of these plants can be successfully confined to developed areas and significantly contribute to the historic and aesthetic value of the Presidio.

Impacts to Visual Resources

Historic Vistas and Valued Views Require Maintenance. Scenic views within the Presidio and adjacent neighborhoods have been obscured by encroaching vegetation and historic visual links have been lost. For example, naturalized forest stands have encroached on the historic views from Inspiration Point and Rob Hill. Screening of non-historic or undesirable views is needed in other areas.

Tree Topping has Reduced Vigor and Aesthetics Along the Perimeter of the Presidio. The Presidio is bordered on the east and south by residential neighborhoods. Some residences have expansive views of the forest, bay, Golden Gate Bridge, and ocean that become blocked by Presidio tree growth. The Army allowed some residents to periodically top certain tree stands to preserve their views, especially the Monterey cypress from Julius Kahn Playground eastward to Walnut Street. Topping has reduced the vigor and visual appeal of the trees and is not considered an acceptable management practice. Alternative solutions that consider both view protection for residents and visual appearance of the Presidio forest need to be explored.

Impacts to Park Visitors and Park Neighbors

Hazardous Conditions Require Some Tree and Landscape Modification. Landscape trees in poor condition can present hazards from tree fall or limb breakage to Presidio visitors and property. An NPS hazard tree survey (Jones & Stokes Associates, Inc. 1997), which estimates the probability of tree failure and the degree of human and property exposure, found a large number of Presidio trees to be potentially hazardous. Tree hazards require continual reevaluation and frequent treatment.

Cumulative Impacts

Sustainability Issues Must Be Considered. Sustainability and conservation concerns include recycling of plant material, wood utilization, efficient use of natural resources (such as water for plant maintenance), and the longevity and maintenance requirements of plants selected for replacement planting.

The Operation of the Presidio Must Become Self-Sustaining. Management costs and business concerns (such as the attractiveness of the Presidio for building leasing) are major considerations in resource management decisions.

2.7 REGULATORY COMPLIANCE REQUIREMENTS

National Environmental Policy Act (NEPA). As a federal facility, the Presidio is subject to the provisions of NEPA, which require an evaluation of impacts associated with federal actions. This requirement was initially met through the preparation of a Final Environmental Impact Statement (FEIS) on the Presidio GMPA. No new construction or major change in management direction from the GMPA is proposed in this document. Section 4, Description of Project Alternatives, addresses alternative vegetation management options that are within the framework of the guidance set by the GMPA. The impacts, as outlined in the GMPA EIS and further evaluated here, are generally beneficial for native species and preservation of historic resources. Any modifications to the VMP would be reviewed through the NEPA process, and where relevant to cultural resources, reviewed in accordance with Section 106 of the National Historic Preservation Act.

Endangered Species Act (ESA). As part of the NEPA compliance process, potential impacts to endangered and other special-status species are assessed. Federal agencies are required by the Endangered Species Act of 1973 to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that their actions do not jeopardize the continued existence of any species listed as an endangered or threatened species or its critical habitat. Consultation with USFWS as required by Section 7 of the Endangered Species Act has been ongoing and maintained on a regular basis by the NPS throughout Presidio planning efforts since 1991. Because threatened and endangered species protection and habitat enhancement are in part the subject of this plan, consultation with USFWS is required. To initiate this process, a letter was sent to USFWS during the scoping phase to inform them of the initiation of this planning process. The USFWS submitted detailed comments on the VMP and EA during the public review period stating that the programmatic VMP did not require USFWS consultation but that subsequent implementation programs affecting federally-listed species should be submitted to the USFWS as required by the ESA. . All management actions by the NPS and the Trust involving federally-listed species will be undertaken in consultation with the USFWS.

National Historic Preservation Act (NHPA). Federal agencies are required to take into account the effects of their actions on properties listed or eligible for listing on the National Register of Historic Places. The Presidio of San Francisco is a National Historic Landmark. Historic buildings, historic landscapes, and archeological resources all contribute to this significant designation. All

undertakings with the potential to affect the historic character of the Presidio require Section 106 compliance review (as mandated by the National Historic Preservation Act) to ensure protection of cultural resources. All actions proposed here that would affect cultural resources have been identified in the final GMPA/FEIS and are covered in the Presidio Programmatic Agreement (PA) between the National Park Service, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation. As specific implementation plans are developed, further review and consultation will be undertaken to assure compliance with Section 106 of the National Historic Preservation Act. All actions and projects that involve ground disturbance and changes to the cultural landscape implemented under the plan will be assessed for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties according to the requirements of the programmatic agreement for that action or project. Actions and projects that involve ground disturbance will be subject to the provisions of the agencies' PA's addressing archeological monitoring and process initiated if unexpected archeological resources are uncovered.

2.7.1 Related Documents and Plans

Several plans, reports, and documents (in addition to the 1994 GMPA) serve as references for this plan and provide information and guidance for the proposed management actions. The majority of these plans and documents were prepared by or for the NPS and are available for public review at Golden Gate National Recreation Area archives with more recent documents posted on the internet at www.nps.gov/planning/index.htm. Documentation of Trust planning efforts and projects is available for public review at the Trust library, or at www.presidiotrust.gov.

Presidio of San Francisco Natural Resource Inventory and Vegetation Management Options (Jones & Stokes Associates, Inc. 1997). The Vegetation Management Plan relies heavily on this comprehensive natural resource inventory and evaluation that was prepared for the NPS. It is incorporated here by reference and it provides the basis for many of the proposed actions as well as information used in determining environmental impacts. This document includes:

- maps, descriptions, and evaluations of vegetation including prehistoric vegetation, existing native plant communities, special-status species, and historic forest stand composition and extent,
- maps and descriptions of soils, geology, and erosion conditions,
- inventory of wildlife and evaluation of wildlife habitat quality,
- evaluation of scenic vistas and other areas of special management concern,
- options for treatment and maintenance of forest and native vegetation,
- evaluation of hazardous tree conditions and recommendations for treatment, and
- methodology and techniques for tree removal, native plant propagation, site preparation and soil treatment, and plant care and maintenance.

Many of the general concepts and procedures from Jones & Stokes Associates, Inc. (1997) are summarized and presented in this document with sufficient detail to allow environmental impact evaluation.

National Park Service Management Policies (NPS 2001). A management policy document that sets the framework and provides direction for all management decisions within NPS. This document establishes the NPS policies for natural and cultural resource management.

Natural Resources Section of the Resource Management Plan (NPS 1994c). A Resource Management Plan for the entire GGNRA was prepared in 1994. This plan addressed vegetation management issues in project statements that are both specific to the Presidio and common to all areas of the GGNRA. The Natural Resources Management Plan identified the need for additional planning for the Presidio's historic forest and native vegetation restoration. Applicable project statements address control of alien plant species, rare plant management, enhancement of several special-status plant species, restoration and management of grassland habitats, and revegetation and nursery management.

National Park Service-77, Natural Resource Management Guidelines (NPS 1991) and **NPS-28, Cultural Resource Management Guideline** (NPS 1994d). These service-wide guidelines establish the basic principles and objectives for natural and cultural resource management by NPS and define the steps for developing an ecologically sound and historically sustainable vegetation management program. They provide general guidance for NPS actions under this plan as well as program guidance for future action plans that will address site-specific vegetation management activities.

The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes (NPS 1996a). Areas of important historic vegetation exist in both the NPS and Trust jurisdictions. These guidelines establish an overall historic preservation approach for identifying, preserving, and rehabilitating historic landscapes as well as a philosophical framework from which to operate. Standards provide direction to cultural landscape owners, stewards & managers, landscape architects, preservation planners, architects, engineers, contractors and project reviewers prior to and during planning and implementation of treatment projects. **Guidelines for Rehabilitating Buildings at the Presidio of San Francisco** (NPS 1995a) and **Presidio Residential Guidelines** (NPS 1998a). These guidelines were developed to assist the NPS staff, tenants, and design consultants in determining acceptable limits in the rehabilitation of structures and their sites and landscape maintenance.

Crissy Field Plan EA and FONSI (NPS 1996b). A foredune system vegetated with native plants, a 20-acre tidal marsh, a historic airfield and a picnic area were among the features adopted as part of this plan for Crissy Field in the Presidio.

Lobos Creek Dune Restoration Action Plan (NPS 1995b). This dune restoration project was undertaken as mitigation for the Richmond Transport Project. This action plan documents the restoration project for project review.

New Presidio Golf Course Facilities Environmental Assessment (NPS 1996c). Specific planting and design plans for the golf course, clubhouse, and maintenance facilities have been reviewed and evaluated in this document.

Draft Cultural Landscape Analysis and Report (Land and Community Associates 1992 and 1993). A comprehensive cultural landscape database for the Presidio and management recommendations for the character-defining features of the Presidio cultural landscape including buildings, roads, trails, water systems, and vegetation began to be assembled in these draft reports.

Other resource inventories, site-specific plans, and internal reports that relate to vegetation management activities at the Presidio are listed in Section 7, References.

Concurrent Planning Processes

- **Presidio Trust Implementation Plan (PTIP)** . The Trust is conducting a comprehensive planning process to update the 1994 GMPA for Area B, the portion of the Presidio in the

jurisdiction of the Trust. The PTIP will retain those portions of the GMPA that have already been implemented or that do not warrant change, and focus on planning concepts that need reviewing due to changed conditions and opportunities since the creation of the Trust. The PTIP incorporates the VMP by reference. To the extent that changes in land use are studied and adopted through the PTIP process and accompanying NEPA review, the PTIP EIS and Record of Decision (ROD) would provide the requisite amendment to the VMP.

- **Presidio Trails and Bikeways Master Plan and EA.** The National Park Service, in collaboration with the Trust, is preparing a Presidio-wide Trails and Bikeways Master Plan to enhance visitor access while protecting the natural and cultural resources of the Presidio. The trail planning process will incorporate the elements of the VMP EA that relate to trails and recreation opportunities. Comments received from the public on the VMP that addressed trails and bikeways issues will be reviewed by the NPS and the Trust in preparing the Trails and Bikeways Plan.
- **Mountain Lake Enhancement Plan and EA.** The Trust has prepared an EA for the Mountain Lake Enhancement Plan, one of few natural lakes in San Francisco. The goals of the project are to improve water quality, enhance habitat and improve public access. The NEPA process is completed, and a FONSI was adopted. The plan is in the early stages of implementation.

Tennessee Hollow Riparian Corridor Restoration. The Trust and the NPS are in the initial data collection stage, subsequent to the restoration planning effort. . **Doyle Drive EIS.** The San Francisco County Transportation Authority (SFCTA) is proposing to replace Doyle Drive, located in the Presidio of San Francisco, within the Golden Gate Recreation Area. Working with the Federal Highway Administration (FHWA), the NPS, the Trust and Caltrans, SFCTA will prepare a joint environmental impact statement/report (EIS/EIR) pursuant to the NEPA and the California Environmental Quality Act for the proposed improvement of Doyle Drive.

2.8 SUMMARY OF THE SCOPING PROCESS

Scoping Process Workshops

A list of issues and general guidelines were presented in a scoping brochure to initiate the planning process for the Presidio Vegetation Management Plan in September 1997. Approximately 1,400 copies were sent to nearby homeowners, neighborhood organizations, current Presidio tenants, representatives of agencies and organizations, and individuals. Many of the addressees were individuals and organizations who had expressed interest in Presidio issues during the planning process for the Presidio GMPA (NPS 1994a).

Public comments were received at two workshops held on September 30 and October 1, 1997, as well as through returned brochures, letters, and e-mail. Over 100 individuals and representatives of organizations responded to the request to provide comments during the scoping phase. These comments, along with resource information and legal and policy requirements, helped shape the management actions, alternatives, and impacts addressed in this VMP. A summary of scoping comments (NPS 1997) was prepared and sent to everyone on the mailing list.

Plan Distribution and Public Comment

After analysis of initial scoping comments and additional public workshops, public presentations on the issues and alternatives were held at meetings of the GGNRA Advisory Commission in 1998 and early 1999, a Public Review Draft Vegetation Management Plan and EA was prepared and released to

the public for review on July 1, 1999, initiating the formal public comment period required by NEPA. It was distributed to city, state, and federal agencies and public interest groups, nonprofit organizations and individuals on the project mailing list. The Plan was also presented to a joint GGNRA Advisory Commission and Trust meeting on July 20, 1999, followed by field trips in July, August and October of 1999. Public comment was taken at Advisory Commission Meetings in July, August, September and October and at a public meeting of the Trust Board on November 17, 1999, at the close of the formal comment period.

Plan Adoption

In October 2000, NPS and Trust staff distributed a report to the GGNRA Advisory Commission summarizing and responding to public comment on the draft VMP (1999) and recommending text edits to the VMP. On October 17, 2000, the Advisory Commission passed a resolution recommending that NPS and the Trust adopt the Vegetation Management Plan with the recommended revisions (see VMP FONSI, Modifications to the Selected Alternative). Both entities adopted the VMP and EA in accordance with NEPA by the signing of a Finding of No Significant Impact (FONSI). The FONSI and the revised Final VMP and EA comprise the NEPA record for this action. This revised Final EA incorporates the clarifications and modifications developed in response to comments raised during public review and a complete list of mitigation measures for implementation of the VMP. A joint FONSI was prepared by the NPS (signed by the NPS Pacific Western Regional Director) and by the Trust (signed by the Executive Director). The FONSI addresses in more detail the principal issues raised by public comments, agency response and, where indicated, resultant clarifications and modifications to the VMP EA. It also includes the table of VMP mitigation measures. Adoption of the revised and finalized Final VMP applies to NPS and Trust actions throughout the Presidio, irregardless of which jurisdiction the action occurs. NPS stewardship projects regularly occur in the Trust jurisdiction; Trust crews and equipment often perform utility maintenance projects or assist NPS crews in Area A of the Presidio. All subsequent site-specific implementation projects for vegetation management in the Presidio will be reviewed for conformance with the Final VMP and EA.

3. VEGETATION MANAGEMENT PLAN

This plan provides concepts for vegetation management within the structural framework of the General Management Plan Amendment. It tiers from the GMPA, and is an intermediate step between the GMPA and future site-specific action plans. The vegetation mosaic of the Presidio offers a unique management challenge — each type of vegetation affects the others and each has significant resource aspects that must be managed and balanced with other valued natural, historic, and recreational resources.

Three of the plan's sections directly relate to the zones shown on Figure 3, Vegetation Management Zoning Map:

Native Plant Communities Zone
Historic Forest Management Zone
Landscape Vegetation Management Zone

Two other sections — soil erosion and control and fire management — contain discussions that are relevant to all three vegetation zones.

Each section consists of a description followed by proposed management actions. The impacts of the adopted management actions are collectively evaluated as the Selected Alternative (Proposed Action) in Section 4, Affected Environment and Environmental Consequences. Other alternatives evaluated include two specific treatment options for forest rehabilitation and a no action alternative.

3.1 VEGETATION MANAGEMENT ZONING OVERVIEW

The basis of the plan is a prescriptive vegetation management zoning map. Management concepts for the resources in each zone are found in the next three sections. The three general management zones — native plant communities, historic forest, and landscape vegetation — are mapped in Figure 3, Vegetation Management Zoning Map.

Vegetation resources have been divided into the three zones based upon resource characteristics and values, historic land uses, and practical management concerns. For example, the historic forest management zone is generally the area that was planted as a result of the afforestation plan as estimated from the extent of the original planted forest. However, the extent of the historic forest is not the only factor in determining the boundary of this management zone. Other factors include management effectiveness and practicality. Small islands cannot be effectively managed without extensive maintenance. Small patches of historic forest are sometimes connected with larger areas, or are zoned in the landscape vegetation category (for instance, when an area of historic forest is in or near a developed area with maintained landscaping).

In the case of native plant communities, it is desirable to connect remnant natural areas when possible in order to enhance their viability and to expand the habitat areas for rare plant populations and increase their chance for recovery. The establishment of larger, contiguous areas (and therefore with fewer edges) in each of the three vegetation zones was favored in delineating the zones to allow more sustainable management. Concepts of "edge" management and vegetation transition are important considerations at the interfaces of the three broad vegetation zones. In particular, the edges between the native plant communities zone, which includes populations of rare species, and the historic forest and landscape vegetation management zones require great attention. The greater the zone edge of native plant communities relative to the zone area, the more difficult it is to manage the zone and the less likely it is that a given rare or endangered species will persist over time.

An additional concern in the designation of vegetation management zones was to preserve valuable wildlife habitat, as well as to enhance future wildlife diversity. Important wildlife habitat is found in the historic forest management and native plant communities zones. The important attributes of each type of wildlife habitat must be considered and protected.

Management concepts that are applicable to each zone, as well as the factors for making site-specific management decisions, are discussed in the following sections. At another level of detail, the management concepts will be tested in practice through adaptive management. The Presidio's living landscape is a dynamic evolving system and adjustments to recommended treatments in the three zones as well as their extent will be continual. Therefore the zoning designations should not be looked on as inflexible mandates. Annual work plans with specific treatments for a geographic area will be developed following additional on-site evaluations and monitoring by resource professionals. These work plans will also be shared and discussed with the public prior to implementation.

Resource values, management objectives, and management strategies vary for the three vegetation zones. The ecological principles to be applied and the target vegetation to be achieved are also varied. In general, retaining the historic character of the Presidio and providing visitor access are high priorities in determining management actions. These management actions will define the makeup of the historic forest and landscape vegetation zones. The restoration of ecological processes and preservation of native species and their genetic integrity are priority issues in areas zoned as native plant communities. In addition, the plan seeks to increase the degree to which native species and natural ecological processes can be applied to management of the historic forest management zone to reduce long-term management and maintenance requirements.

Special Management Zone. In addition to the three vegetation communities zones, the southwest corner of the Presidio has been designated a Special Management Zone (SMZ) to further focus on the specific conditions in this area (see Figure 3, Vegetation Management Plan Zoning and Figure 3A, Special Management Zone for the Presidio). This area has been subject to major physical change since adoption of the GMPA due to construction of the Richmond Transport Sewer project, subsequent sewer failures with washouts and slope failure, and revegetation efforts near Lobos Creek. The area also contains lands that are being considered as important habitat for an endangered plant species, the San Francisco lessingia, in a U.S. Fish and Wildlife Service Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula (currently in preparation). Following the finalization of the Recovery Plan, an interdisciplinary group comprised of a variety of resource experts and representatives of adjacent homeowners and park users will chart the appropriate future vegetation zoning and treatment for this area in a collaborative setting based on considerations of vegetation type and land use, viewshed, biological, and neighborhood impacts.

3.2 NATIVE PLANT COMMUNITIES ZONE

3.2.1 Description of Native Plant Communities

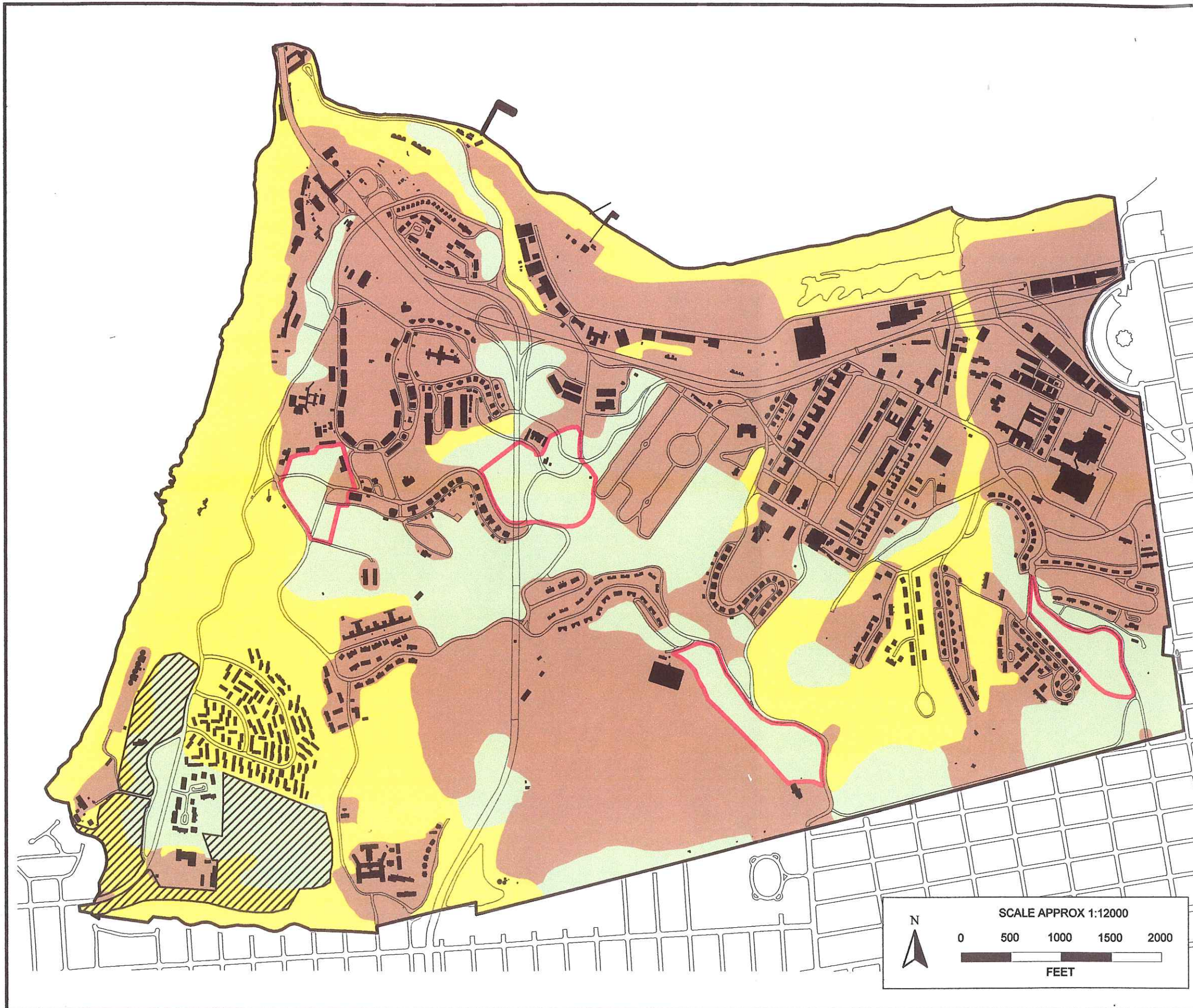
Written records indicate that the coastal hills and valleys that we now know as the Presidio were mostly treeless during early period of European settlement of the area. From early written accounts and comparisons with other similar habitat, the natural vegetation in the Presidio was rich and varied. Beaches and dunes in the lowlands were home to wildflowers and grasses interspersed with dense and colorful shrublands and oak woodland groves. In upland areas, shrublands and oak groves were interspersed with wildflower-rich prairies. Along the bay, a large tidal marsh occupied low-lying areas while the bluffs above the marsh supported an oak and bay woodland (see Figure 4, Probable Presidio Native Vegetation Prior to European Settlement).

Existing Vegetation Types

Once-abundant native plant communities have been almost entirely lost in San Francisco, and the Presidio is an essential refuge for these communities. Historical land management practices on the Presidio, such as grazing, development and planting, as well as the naturalization of planted and invasive non-native plants, have displaced, altered, and reduced much of the native vegetation. This significant loss and modification of natural habitat has resulted in an associated loss of native plant species and plant diversity. Less than 10 percent of the Presidio's 1,480 acres support indigenous native plant communities and most of these natural areas are small, separated from one another by development or horticultural plantings, and impacted by invasive non-native plants.

The remaining native plant communities in the Presidio occur primarily on the west- and north-facing coastal bluffs from Crissy Field to Baker Beach and as scattered habitat fragments in the southwestern and southeastern portions of the Presidio (see Figure 2, Presidio Place Names and Figure 5, Existing Native Plant Communities). Native plant communities now found at the Presidio are discussed briefly below:

Figure 3. Vegetation Management Zoning Map for the Presidio



Native Plant Communities Zone

- Preserve and enhance existing native plant communities
- Remove nonnative plants and restore native vegetation
- 26% of total area (approx. 384 acres)

Historic Forest Zone

- Preserve and rehabilitate historic forest to historic boundary
- Prune or remove hazardous trees
- 18% of total area (approx. 264 acres)

Landscape Vegetation Zone

- Preserve and rehabilitate historic landscape vegetation
- Ensure conformance of new plantings
- 52% of total area (approx. 778 acres)

Special Management Zone*

- Area requiring further assessment. Area is under consideration for designation by the USFWS as recovery habitat for the Federally-listed endangered San Francisco Lessingia.
- 4% of total area (approx. 62 acres)

Key Historic Forest Stands

*Note: The boundary of the Special Management Zone has changed from that depicted in the VMP Staff Report (October, 2000). The Special Management Zone boundary conforms to the Area A boundary, which has been surveyed and adjusted to meet law enforcement and maintenance needs.

Source: NPS, Presidio Trust, 2001.

Figure 3a. Special Management Zone for the Presidio



 Special Management Zone



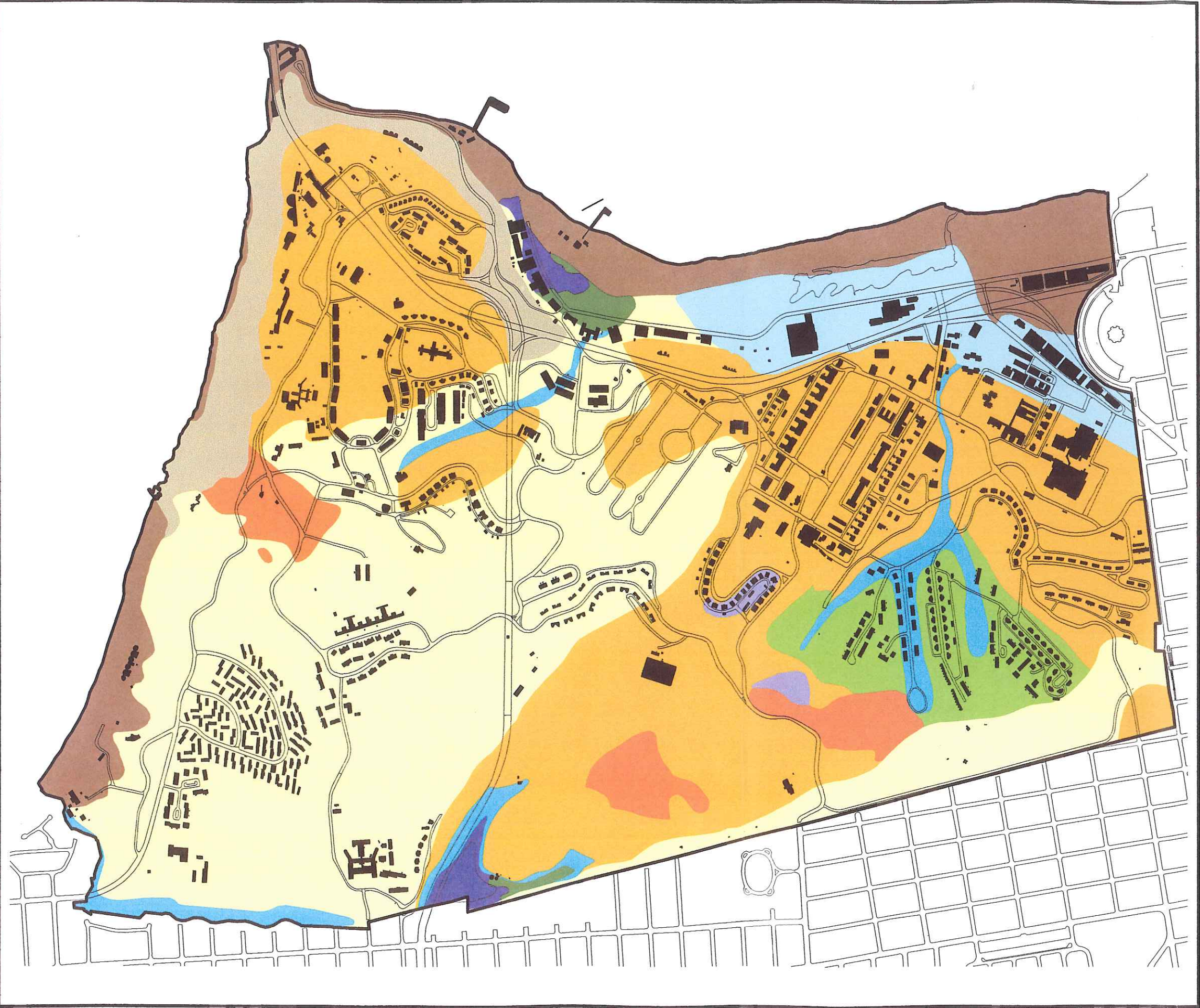
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NOTES:

1. This region is under consideration by the U.S. Fish and Wildlife Service for the enhancement of San Francisco Lessingia habitat.
2. This region has been subject to construction, slope failure, and restoration efforts resulting in changed conditions that require reassessment of the management zones.
3. This region generated the highest number of diverging public comments which will be resolved through reexamination of San Francisco Lessingia habitat and the changed physical conditions.
4. The boundary of the Special Management Zone has changed from that depicted in the VMP Staff Report (October, 2000). The Special Management Zone boundary conforms to the Area A boundary, which has been surveyed and adjusted to meet law enforcement and maintenance needs.

Source: NPS, Presidio Trust, 2001.

Figure 4. Probable Presidio Native Vegetation Prior to European Settlement



- Foredune
- Dune Scrub
- Bluff Scrub, Coastal Scrub, and Serpentine Scrub
- Coastal Prairie and Coastal Scrub
- Coastal Prairie
- Coast Salt Marsh
- Serpentine Grassland and Serpentine Scrub
- Freshwater Marsh
- Arroyo Willow Riparian Forest and Live Oak Riparian Forest
- Live Oak Woodland and Coastal Scrub
- Open Water

Source: Jones & Stokes Associates, Inc., 1997.



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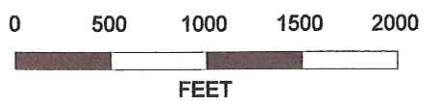


Figure 5. Existing Presidio Native Plant Communities



Communities

- WR Arroyo Willow Riparian Forest
- BS Bluff Scrub
- CP Coastal Prairie
- SM Coastal Salt Marsh
- CS Coastal Scrub
- DS Dune Scrub
- F Foredunes
- FM Freshwater Marsh
- OR Live Oak Riparian Forest
- OW Live Oak Woodland
- RS Riparian Scrub
- SC Serpentine Scrub
- SG Serpentine Prairie

Source: Jones & Stokes Associates, Inc., 1997 and NPS, 2001.



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Foredune is an open community of low perennial herbs and small shrubs found at Crissy Field and Baker Beach, just beyond the shoreline. It is dominated by beach sagewort, sand verbena, silver beachweed, coast buckwheat, Chamisso's, lupine, beach primrose, American dune grass, and beach strawberry. Plants associated with this community are tolerant of desiccating, salt-bearing winds.

Dune scrub is found on the sand terrace slopes above Baker Beach, in the Lobos Creek Dunes, and in several other small patches. This inland sand dune community of shrubs and annual and perennial wildflowers is characterized by densely packed shrubs interspersed with scattered grassy openings. It is dominated by mock heather, lizard tail, bush monkeyflower, coyote brush, bush lupine, chamisso lupine, poison oak, California coffeeberry, and California blackberry. The special-status species San Francisco champion, San Francisco wallflower, San Francisco spineflower, dune gilia, and San Francisco lessingia are found in association with this community.

Bluff scrub occurs on steep, ocean- and bay-exposed bluffs and serpentine outcrops at Fort Point and north of Baker Beach. Bluff scrub is dominated by low shrubs and prostrate herbaceous species including California blackberry, prostrate blue-blossom ceanothus, poison oak, lizard tail, and toyon. Special-status species associated with this community are coast rock cress, San Francisco wallflower, and San Francisco gumplant.

Coastal scrub is similar in assemblage to bluff scrub but found at a slightly higher elevation on the gentle slopes and inland areas. This community is dominated by California blackberry, poison oak, prostrate and erect coyote brush, golden yarrow, toyon, and arroyo willow.

Coastal prairie was once the most common plant community in the Presidio. This grass and herb community is found on coastal terraces that have well-developed soils. Coastal prairie is dominated by purple needlegrass, foothill needlegrass, California oatgrass, and many non-native grasses.

Serpentine grassland is a rare grass- and herb-dominated community found on well-developed serpentine soils on sites north and east of Inspiration Point. It is dominated by purple needlegrass and foothill needlegrass as well as serpentine-endemic special-status species such as the Presidio clarkia and Marin dwarf flax.

Serpentine scrub community intergrades with serpentine grassland and serpentine barrens from the World War II Memorial on both sides of Lincoln Boulevard north to the Golden Gate Bridge. It occurs on serpentine outcrops and shallow serpentine soils and is dominated by blue blossom ceanothus, toyon, osoberry, and California blackberry. This community, along with adjacent serpentine communities, provides habitat for several special-status species: Raven's manzanita, Presidio clarkia, Marin dwarf flax, San Francisco owl's clover, San Francisco gumplant, coast rock cress, and San Francisco wallflower.

Freshwater marsh, found around the edges of Mountain Lake and within the Crissy Field dune swale, is an herbaceous community occurring in areas with perennial flooding or soil saturation. Dominant species are tules and cattails.

Freshwater seep (not delineated on figure) is an herbaceous plant community dominated by rushes and sedges. It is found in the Presidio in scattered sites with seasonal or perennial soil saturation from groundwater seepage. Seeps occur along the bluffs north of Baker Beach and above Crissy Field, near Inspiration Point, and north of the Public Health Service Hospital. The special-status Franciscan thistle occurs in this community.

Live oak riparian forest is a stream- or lake-associated community dominated by dense stands of coast live oak occurring in the Presidio above the willow riparian zone adjacent to Lobos Creek.

Arroyo willow riparian forest is a stream- or lake-associated community dominated by arroyo willow, often in dense, pure stands. It occurs in the wettest zones of perennial creeks and ponds and seasonal drainages, such as Lobos Creek and the Mountain Lake shoreline.

Riparian scrub, found in a small area north of the Public Health Service Hospital tennis court, this stream- or lake-associated community is dominated by shrubs and small trees including California wax myrtle, coyote brush, and arroyo willow.

Live oak woodland is found in moist, sheltered sites away from the immediate coast dominated by coast live oak with an understory of grass or shrubs. Only small stands now exist at the Presidio. Historically, other small trees (such as buckeye, madrone, or California bay) may have occurred with live oak.

A coastal tidal salt marsh system was present at Crissy Field before the wetland feature was drained and filled. Freshwater and brackish marshes were also found on the upland edge of the Crissy Field wetland. Some of this coastal marsh has been recently reclaimed through the creation and restoration of the Crissy Field tidal marsh.

Native Plant Habitat of Particular Concern

The Presidio plant communities with the highest diversity of native plant species are those found on serpentine substrates. These biologically rich grassland and scrub communities provide habitat for many of the Presidio's native herbaceous annuals and perennials, native grasses, and shrubs. The serpentine grassland community was once extensive and stretched across the San Francisco peninsula. Now the Inspiration Point area contains some of the last remaining serpentine grassland in the Bay Area. Many plant species have become specially adapted to this unique habitat, and as the habitat has diminished, more species have become rare or endangered.

The native dune community at Crissy Field and the dune scrub community above Baker Beach (one of the few remaining intact stands of dune scrub in San Francisco, and in all of central California) provide important and unique habitat. These communities have been identified as Special Ecological Areas (SEAs) by resource managers of Golden Gate National Recreation Area. A SEA is identified in each plant community type that is most biologically intact and diverse. The natural resources are the highest priority within a SEA in order to ensure protection and maintenance of ecological diversity and processes.

Since 1995, the NPS and community volunteers have been working to restore the native plant habitat at several restoration sites throughout the Presidio, including:

- foredune and dune scrub communities at Baker Beach, Wherry Dunes, North Baker Beach, Lobos Creek Dunes, Battery Caulfield Road, Presidio Hills, Rob Hill, and Crissy Field,
- coastal bluff scrub, serpentine scrub, and serpentine grassland communities at Fort Point and along the northern coastal bluffs and the World War II Memorial,
- serpentine grassland community at Inspiration Point,
- riparian forest communities at Lobos Creek and Mountain Lake, and
- coastal salt marsh and freshwater marsh at Crissy Field.

Special-Status Species

The Presidio of San Francisco supports an unusually large number of rare plant species because of its unique combinations of climate and soil conditions. Thirteen rare plant species are known to occur, and several other rare plant species have occurred here in the past that are locally extinct. With so little habitat remaining, it is surprising that populations of rare species are still represented at the Presidio. Rare plant populations that remain are small and scattered.

Special-status species meet one of the following criteria:

- legally protected as threatened or endangered under the federal or state Endangered Species Acts,
- proposed for listing under these acts,
- listed under the California Native Plant Protection Act by California Department of Fish and Game, or
- listed by the California Native Plant Society as rare, threatened, endangered, or of limited distribution.

Species listed in Table 1, Special-Status Plant Species in the Presidio, are known to occur at the Presidio. These species have been identified as being within the Presidio by members of the California Native Plant Society, NPS biologists, and biological consultants under contract to the NPS.

The principal habitat for most of these rare species is remnant natural areas of dune scrub, serpentine scrub, serpentine grassland, and bluff scrub communities. In some areas, the habitat for special-status plants has been greatly modified and rare plants are intermixed with planted and naturalized forest stands. Important areas include the sand terraces at Baker Beach, the serpentine coastal bluffs and cliffs west of Lincoln Boulevard from the Golden Gate Bridge to the south, and the serpentine areas east of Lincoln Boulevard. Other rare plants are found in serpentine grasslands near Inspiration Point extending down to El Polin Spring and at Crissy Field.

The site locations of special-status species have been surveyed and are frequently monitored to detect threats, evaluate management actions, and census population numbers for special-status plants. Many population sites have been fenced for further protection (for example, the population of San Francisco lessingia at Rob Hill). Groups such as the California Native Plant Society and the Presidio Park Stewards have studied, monitored, photographed, planted, seeded, and weeded rare plant sites for over two decades.

3.2.2 Proposed Management Actions

Objectives for Management of Native Plant Communities

Management of native plant communities and special-status species will be guided by the following objectives:

- *Protect and enhance existing native plant communities and their remaining habitat by removing threats to native species, repairing damage to habitat, and increasing reproductive success.*
- *Restore and enlarge native plant communities by reclaiming habitat from past development, non-native species, and non-native trees outside of historic forest management zone.*

- Preserve and enhance rare plant species habitats by evaluating species-specific habitat needs and giving high priority to actions that preserve and enhance those habitats.
- Protect and enhance wildlife habitat by expanding habitat for native plants, increasing native species and habitat diversity, avoiding disturbance to non-native forests with high wildlife value, and avoiding disturbance to wildlife habitat during critical times of the year (e.g., nesting bird season).

**Table 1
Special-Status Plant Species in the Presidio**

| Common Name | Scientific Name | Federal/State/CNPS Status |
|----------------------------|---|---------------------------|
| Coast rock cress | <i>Arabis blepharophylla</i> | --/--/4 |
| Raven's manzanita | <i>Arctostaphylos hookeri</i> var. <i>ravenii</i> | E/CE/1B |
| San Francisco spineflower | <i>Chorizanthe cuspidata</i> | --/--/1B |
| Franciscan thistle | <i>Cirsium andrewsii</i> | --/--/proposed 1B |
| Presidio clarkia | <i>Clarkia franciscana</i> | E/CE/1B |
| San Francisco wallflower | <i>Erysimum franciscanum</i> | --/--/4 |
| Dune gilia | <i>Gilia capitata</i> ssp. <i>chamissonis</i> | --/--/proposed 1B |
| San Francisco gumplant | <i>Grindelia hirsutula</i> var. <i>maritima</i> | --/--/1B |
| Marin dwarf flax | <i>Hesperolinon congestum</i> | T/CT/1B |
| San Francisco lessingia | <i>Lessingia germanorum</i> | E/CE/1B |
| San Francisco champion | <i>Silene verecunda</i> ssp. <i>verecunda</i> | --/--/1B |
| California sea blite | <i>Suaeda californica</i> | E/CE/1B |
| San Francisco owl's-clover | <i>Triphysaria floribunda</i> | --/--/1B |

Notes:

Status definitions:

-- = no listing status

Federal: U.S. Fish and Wildlife Service (50 CFR 17.12, 61 FR 40:7596-7613, Feb. 28, 2000)

E = listed as endangered under the federal Endangered Species Act

T = listed as threatened under the federal Endangered Species Act

State: California Department of Fish and Game (2001)

CE = listed as endangered under the California Endangered Species Act

CT = listed as threatened under the California Endangered Species Act

CNPS: California Native Plant Society (Skinner and Pavlik 2000)

1B = List 1B species: rare, threatened, or endangered in California and elsewhere

4 = List 4 species: plants of limited distribution

To attain these objectives, the following actions are proposed for the native plant communities zone shown in Figure 3, Vegetation Management Zoning Map for the Presidio.

Continue Development of a Long-Term Inventory and Monitoring Program

A long-term inventory and monitoring program will allow evaluation of the success of native plant community enhancement and restoration projects. Long-term monitoring requires the development of a documented process for collecting standardized, useful information that can be repeated in the future so that comparisons can be made. Procedures for collecting information are established and

institutionalized to allow regular and reliable sampling, data analysis, and reporting over the long term.

Monitoring procedures usually call for periodic vegetation mapping, the establishment of permanent transects and photopoints in representative plant communities as well as sensitive areas (such as special-status species habitat), and documentation of sampling frequency and techniques. The current monitoring program includes:

- photo-monitoring and regular qualitative evaluation of most existing native plant communities,
- permanent transects in the serpentine grassland at Inspiration Point and the dune scrub above Baker Beach,
- a detailed monitoring protocol for assessing the development of re-created dune wildflower and scrub communities, and
- annual censusing and/or range mapping of all thirteen special-status plant species.

A monitoring plan is currently in preparation for the Crissy Field marsh and dune restoration project. Additional restoration sites will be monitored using similar procedures.

Information gathered by the monitoring program will be used to:

- assist in documenting changes in habitat and species conditions,
- monitor population and species composition changes,
- increase knowledge of the natural history of rare species (especially the range of natural variation in population sizes of rare annual plants),
- alert staff to potential threats to habitat and individual species so that corrective actions can be taken, and
- provide a baseline for measuring the effectiveness of enhancement and restoration efforts as they are implemented.

As inventory and monitoring programs are developed, areas will be identified where additional research is needed. Project statements documenting research requirements will be developed.

Protect Remaining Native Plant Communities

The remaining native plant communities as described in a previous section and mapped in Figure 5, Existing Presidio Native Plant Communities, will be preserved and protected from further deterioration. Threats to existing plant communities are from several sources. The most serious threat to native plant communities in the Presidio is the invasion of naturalized forest trees and aggressive non-native plants. Other threats are visitor foot traffic and drainage alternations that result in soil erosion and habitat loss. Erosion is particularly acute in a few very susceptible soil types where trails have not been built to an adequate standard. Natural resources affected by trampling and changes in run-off from development and visitor activities have been identified, and corrective actions have been proposed (see Section 3.5, Soil Erosion and Control).

Restrict and Contain Forest Trees. Native plant populations can be reduced or eliminated through shading or competition from non-native plant species. Trees have naturalized and expanded into

native plant communities outside of areas that were originally planted. As trees become established in grassland, shrub, and open dune communities, they alter the habitat by creating a shady, moist, and more nutrient-rich environment that few native plant species can tolerate, reducing both native species diversity and population sizes. These conditions also encourage establishment of invasive non-native species.

Continual and long-term management is required to protect existing native plant communities from habitat invasion by forest species. Of the three primary forest species, eucalyptus has the strongest tendency to naturalize, but Monterey pine and Monterey cypress have invaded natural habitat as well, notably in the Inspiration Point serpentine grassland community. Containment efforts are required to constrain expansion beyond the historic forest management zone through eradication of volunteer seedlings and saplings of forest species.

Develop Buffer Areas. Management of the edges between native plant communities zones and historic forest management zones requires special attention to contain non-native trees. Containment may be assisted in some areas by the development of a 50- to 100-foot-wide buffer of native plants and shrubs. Such a buffer within an adjacent historic forest management zone could allow better protection of existing native plant communities and reduce maintenance and containment efforts (refer to the subsection, Explore the Development of Native Species Buffer Areas, in Section 3.3.2).

Remove Aggressive Non-native Species. Management of non-native species is two-fold: 1) prevent further introduction of non-native species, and 2) control and remove existing non-native species.

Future revegetation efforts throughout the Presidio will take into account the potential for non-native plants to invade and threaten native plant communities.

- Non-native plants will be removed from native plant communities, to the extent possible.
- Plant eradication efforts will focus on the most aggressive weedy species that threaten native plant communities because they can rapidly overtake and out-compete native vegetation, especially if the site is disturbed.
- Exceptionally invasive plants such as Andean pampas grass, Australian fireweed, Bermuda buttercup, French broom, Cape ivy, gorse, European dune grass, and sow thistle have the highest priority for eradication and will be removed wherever they are found on the Presidio. Iceplant, albizia, wattle(acacia), velvet and orchard grass, and bentgrass, European annual grasses, prickly ox-tongue, and myoporum particularly threaten serpentine communities.
- A variety of other non-native species will also be removed as labor becomes available to conduct this work. Non-native grasses will be managed for minimization.
- Proposed new plantings throughout the Presidio will be screened against the plant lists developed by park resource managers and landscape architects. The plant lists identify invasive non-native plant species that threaten native species and indicate which plants are prohibited from use as horticultural landscape plants, or that have restricted use and require confinement to historic landscape vegetation zones. Plants that are prohibited and restricted in landscape use are further discussed in Section 3.4.3, Proposed Management Actions, for the landscape vegetation management zone.
- Conduct testing to determine the invasive plant removal methods that are the most cost effective and least damaging to other natural resources. Methods for effective removal and control will

vary for each non-native species. For some species, one-time hand or mechanical removal will be effective.

Because native plant communities are found in a patchwork pattern and are often ecological islands, they will continue to be affected by non-native plants. Control will require vigilance, periodic weed removal, and a long-term determined effort. Some non-native plants, such as annual grasses and some annual and perennial forbes, are so established that it will be nearly impossible to eliminate their presence from native habitat areas. However, if monitoring identifies threats to native species, control efforts will be initiated.

Additional information and specific strategies that will be implemented to prevent further non-native species introduction and to control local populations can be found in the program statement "Control of Alien Plant Species" in the Natural Resources Section of the Resource Management Plan (NPS 1994c).

Restore Native Plant Communities

Opportunities for native plant restoration within the Presidio are provided by the removal of non-native forest trees from areas outside of the historic forest management zone, removal of other invasive non-native vegetation, removal of non-historic buildings and development, and vista clearing. Eventually all of the areas zoned as native plant communities on the Vegetation Management Zoning Map (Figure 3) will be restored. (The zone includes both existing native plant communities and areas that will be restored to native plant communities.)

Proposed Restoration Sites. Most of the sites proposed for restoration are contiguous with existing native vegetation communities. Most have special attributes such as riparian and aquatic habitats that can greatly enhance wildlife values, biologically rich communities found on serpentine substrate, and habitat for rare and endangered plants. The proposed restoration areas are:

- the western portion of the Presidio to restore and expand existing dune, bluff, coastal scrub, and grassland areas,
- the northern shore of the bay as previously identified in plans for Crissy Field,
- area around Mountain Lake,
- Lobos Creek drainage,
- Rob Hill viewshed,
- portion of Wherry housing site,
- areas with rare serpentine soils that support serpentine grassland and serpentine scrub communities near Inspiration Point and the World War II memorial,
- rare dunes at the Public Health Service Hospital, Hicks drainage, and Crissy Field,
- areas north and east of the Public Health Services area,
- Infantry Terrace viewshed,
- riparian habitat of El Polin Spring and the Tennessee Hollow drainages, and

- other scattered locations with habitat for rare plant species and where remnant native plant communities and riparian areas can be enhanced or enlarged.

The appropriate native plant community to be restored will be the plant community that occurred at each restoration site prior to European settlement. The presumed native plant communities that would have occurred at restoration sites have been determined based upon soils, geology, and existing vegetation and are mapped in Figure 4, Probable Presidio Native Vegetation Communities Prior to European Settlement. Species planted in each restoration site will be representative of all successional stages of that particular native plant community, according to current restoration protocol on sites such as Lobos Creek Dunes.

Restoration Concepts and Process. The general restoration concepts and methods identified in this section will guide native plant community restoration. Many of the restoration areas now contain forest trees that have expanded beyond the historic forest management zone and will be removed prior to restoration. Other sites will require restoration following the removal of other types of non-native plants or of non-historic development (such as the Wherry housing area). Restoration methods specific to various habitat types are also found in Jones & Stokes Associates, Inc. (1997).

Restoration actions will be planned and evaluated on a site-specific basis by a multidisciplinary vegetation management team so that the impacts of management actions on soils and remaining natural resources can be minimized. A restoration action plan will be prepared for each restoration site to document the process and allow project review. Any of the following procedures that mitigate environmental impacts will also be implemented when rehabilitating historic forest areas (refer to the subsection, Process for Site-Specific Rehabilitation of Historic Forest Stands, in Section 3.3.2).

Conduct On-Site Evaluation. No tree removal activities will be conducted during the breeding season for most bird species (February through August 15). Prior to tree removal, each work site will be evaluated by biologists to determine the status of the following factors:

- The presence of known or suspected nest sites for raptors. A nest that has been used within the past three years will be considered potentially active. All trees will be left within a 100-foot radius of any active or potentially active nest site.
- Any elements of the forest or the proposed restoration site that may provide habitat for any special-status species. Measures will be developed for avoiding any elements identified.
- The relative wildlife habitat value of any forest stand to be removed. Non-native forest stands with high wildlife values will generally be retained, unless they will be replaced incrementally with native plant communities that are very rare, such as serpentine communities, or that also have high wildlife value, such as coast live oak or willow riparian plant communities.
- Any significant roosting or other wildlife use of the habitat that requires management. For example, trees should be assessed for use by Pygmy nuthatches, which are communal roosters and utilize tree cavities throughout the year.

Propagate Plant Material for Restoration

- All plant material (i.e., seeds, cuttings, and whole plants) used for native plant community restoration projects will be derived from populations of native species presently or historically occurring on the Presidio in order to protect locally distinct genetic types.
- Seeds and plant material will generally be propagated in the native plant nursery on the Presidio.

- Work crews will be carefully trained to minimize trampling of native vegetation and maximize native plant salvaging (by collecting seeds, cuttings, or whole plants) prior to forest removal in areas that are to be restored. This salvaged material can be used in habitat restoration efforts by planting into prepared sites or propagated and stored at the native plant nursery for future use.

Prepare the Restoration Site and Enhance Soil Conditions. Careful site preparation and reestablishment of appropriate soil conditions at restoration sites is key to success of native habitat restoration. Measures to prepare the site and enhance soil conditions will include:

- Identify the extent of the area to be disturbed by restoration activities and, if necessary, delineate the boundaries of the work area with habitat fencing where needed to protect adjacent native plants, wildlife habitat and/or cultural resources.
- Limit heavy equipment use to avoid soil compaction to the extent possible.
- Fell trees within the restoration area, taking care to protect adjacent native vegetation.
- Remove slash and debris. Stumps may be pulled and removed in dune soils if this task can be accomplished without compaction from equipment. To minimize soil disturbance and compaction on nondune soils, stumps will be left in place and cut flush to ground level.
- Remove forest litter and duff that can prohibit native plant establishment and growth.
- Counteract water-repelling (hydrophobic) and acidic soil characteristics through soil treatment. Hydrophobic soil conditions occur in some soils (such as sandy soils where dune scrub restoration will occur) under Monterey cypress, increasing the tendency to shed water and increase erosion.
- Control potential soil erosion through revegetation, drainage control, surface stabilization, or redirection of trails. In general, grass seeding is not an appropriate method for erosion control because a grass cover will interfere with native habitat restoration. To avoid unnecessary erosion, tree and log removal should not take place in winter and spring when rains are still likely and soils are moist and most vulnerable to compaction and erosion.
- Reestablish drainage patterns when needed.

Plant Native Plants. Plant the prepared site with native plants propagated from Presidio stock. The appropriate native plant assemblage to be planted will be based upon the historical record, identified reference sites, and site conditions.

Prior to any new introductions to restore a native plant species that once occurred, but is no longer present, a literature review and documentation of the justification for the reintroduction decision will be made. This documentation will inform future ecologists of the manipulation that has taken place.

Maintain and Evaluate Restoration Success

Restoration sites will be maintained and monitored at least until criteria are met to ensure their success. Maintenance may include weeding, remedial erosion control, posting of interpretive signs, preventing damage to native vegetation from human activities, and additional planting and seeding. Periodic non-native species control will be necessary in most sites. When the restoration site previously contained eucalyptus or acacia, sprouts and sprouting stems may be selectively treated with an herbicide in conformance with an integrated pest management plan.

Documentation of methods used in each restoration site and nursery documentation will allow evaluation of restoration efforts. Monitoring will be accomplished through the long-term monitoring program previously described.

Manage and Enhance Habitat for Rare Plants

Monitor Special-status Species. Recovery of rare plant species requires that existing species, populations, and habitat be protected; new populations be established; and habitat and species be monitored and managed. One critical element in the management of rare species — a reliable and consistent monitoring program — has been described in a previous section. Baseline data are needed on all special-status species to adequately establish their listing status, determine the effects of management actions, and track population trends over time. Monitoring of all known special-status species populations will be conducted annually until the natural variation in population size is well documented (perhaps 10 years for annual species), and after that at least once every 3 years.

Enhance Habitat. Ongoing and future research will expand knowledge about individual special-status species, their distribution, their habitat requirements, their threats, and propagation methods. As managers learn more about these species, actions will be taken to increase suitable habitat and to increase the size of populations through propagation. Actions that are currently underway and that will continue for the enhancement of all thirteen special-status species occurring at the Presidio are summarized here (Jones & Stokes Associates, Inc. 1997, NPS Resource Management Staff).

Raven's Manzanita. All management actions for this federally listed species will complement the USFWS recommendations listed in the Raven's manzanita recovery plan and will be undertaken in consultation with the USFWS. A single wild plant and cuttings taken from this individual and planted at the Presidio comprise the existing population of this plant. It grows in shallow, rocky soils, including serpentine, on coastal bluffs and probably also occurred in serpentine scrub areas. The plant can be propagated from cuttings.

Enhancement recommendations include:

- identify sites with suitable serpentine soils for serpentine scrub,
- identify sites, from those with suitable soils, that support non-native species as the dominant or a major component of the vegetative cover,
- clear non-native species and thin native species that are directly competing with the Raven's manzanita, leaving exposed sites for revegetation,
- plant rooted cuttings of Raven's manzanita in openings with full sun and sufficient open surface for expansion with a suite of native species that occur in the same habitat,
- fence or otherwise restrict human access to the restoration sites, and
- remove all non-native plants that establish near or encroach on the manzanita plants for at least 5 years after restoration.

Presidio Clarkia, Marin Dwarf Flax, and San Francisco Owl's Clover. All management actions for the Presidio clarkia (federally listed, endangered) and Marin dwarf flax (federally listed, threatened) will complement the USFWS recommendations listed in both the Serpentine Soils and draft Coastal Plants of Northern San Francisco Peninsula recovery plans for these species. All actions will be undertaken in consultation with the USFWS. Propagation and habitat requirements of these three

small annual species are similar. They occur in the Presidio in open serpentine habitat within serpentine scrub and grassland where steep slopes, road cuts, and other disturbances have created openings and removed surface soils. Invasive non-native species, biking, hiking, and erosion threaten these plants. Serpentine soils with suitable habitat are limited but occur on north- and west-facing coastal bluffs near Inspiration Point and between Battery Crosby and Fort Point, and on the bluffs above Crissy Field. Suitable sites for establishing new populations of these species may be found where forest stands are removed from serpentine soils. Seeding locations will be protected from human and dog disturbance and monitored.

Enhancement recommendations include:

- identify suitable serpentine soil areas for potential enhancement efforts;
- remove non-historic trees and other non-native vegetation from areas in suitable soils;
- remove buildup of vegetative debris on top of suitable soils to promote the thin, rocky serpentine soils in which these species occur;
- seed existing and created open serpentine barrens within serpentine scrub and grassland; and
- fence or otherwise restrict human access to the restoration sites during plant establishment. Reevaluate allowable public access on a site specific basis after monitoring;

San Francisco Lessingia, San Francisco Spineflower, Dune Gilia, and San Francisco Campion. All enhancement actions for the San Francisco lessingia (federally listed, endangered) will be undertaken in consultation with the USFWS. The USFWS will soon release a draft Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula that will provide further guidance for recovery actions necessary to restore habitat for San Francisco lessingia and associated dune species. The SMZ in the southwest corner of the Presidio is designated partially in anticipation of the forthcoming release of this recovery plan to allow the NPS and the public to proceed with planning this area once this important guidance on San Francisco lessingia management has been finalized.

Enhancement recommendations and habitat requirements of these herbaceous dune wildflower species are similar. Prior to urban development, San Francisco lessingia, dune gilia, and San Francisco spineflower occurred in clearings within coastal dune scrub throughout the San Francisco peninsula. San Francisco campion ranged from San Francisco to San Luis Obispo County in coastal dune scrub. Threats to the Presidio populations of all rare dune species are from trampling by visitors, pets, and bicycles, and encroachment of ice plant, annual grasses, and naturalized forest trees. On a larger scale, the lack of open corridors to allow for movement of sand has cut off these species from the processes that would naturally open up new suitable habitat. These species prefer full sun and open sandy substrate, and as early successional species, they require new sites opened by disturbance to persist.

Habitat and population enhancement recommendations include:

- control of non-native weedy species,
- maintain open sand areas in full sun near existing populations to create new habitat,
- remove non-historic trees that are shading existing populations,
- remove non-historic trees that will promote the reestablishment of wind corridors,

- collect seeds from extant populations and directly seed any restored areas of suitable habitat according to successful developed protocols (NPS 1995b, *Lobos Creek Dunes Restoration Management Plan*),
- restrict human and dog access to plant populations, and
- evaluate the potential for dynamic habitat enhancement, including artificial disturbance of patches of dune scrub in appropriate areas.

California Sea Blite. All enhancement actions for the California sea blite (federally listed, endangered) will be undertaken in consultation with the USFWS. This wind-pollinated, succulent-leaved perennial shrub is in the goosefoot family (Chenopodiaceae). The historic range of this species was limited to the San Francisco estuary and the vicinity of Morro Bay. Historic accounts and herbarium specimens indicate sea blite's distribution was concentrated in the central part of the San Francisco estuary, with a majority of the collections originating from sandy tidal marshes (Heimbinder & Farrell, 2000). No remnant populations occur in the San Francisco Bay. Several sea blite individuals were planted in three distinct areas of the high marsh zone at the restored Crissy Field site as an experiment in Spring 2001, and will continue to be monitored to determine whether or not the population establishes.

Enhancement recommendations include:

- remove invasive non-native vegetation that may establish in marsh habitat, and
- propagate plants and plant into suitable sites, necessary to establish enough individuals until population becomes self-sustaining,

San Francisco Wallflower, Coast Rock Cress, and San Francisco Gumplant. These three low-growing perennial herbs occur in a wider range of habitats than the other special-status species. The San Francisco wallflower can survive in open dunes and in clearings in dune scrub, serpentine scrub, coastal scrub, and bluff scrub. Currently it is found in many small patches in dunes and along the bluffs on the western edge of the Presidio. San Francisco gumplant occurs in serpentine grassland and openings in serpentine scrub and coastal scrub. Coast rock cress occurs on rocky soils and rock outcrops among bluff scrub, coastal scrub, serpentine scrub, and serpentine grassland. San Francisco gumplant and coast rock cress populations are sited on the bluffs between Battery Crosby and Fort Point and in the bluffs to the east of Fort Point. San Francisco wallflower and San Francisco gumplant have been successfully propagated at GGNRA nurseries and have become established from plantings on a few existing restoration sites. Current threats to these species include competition from non-native vegetation, shading and buildup of litter on the soil surface from naturalized trees, and pedestrian trampling and related erosion, particularly along the social trails of the coastal bluffs.

Enhancement recommendations include:

- remove invasive non-native vegetation, including non-historic trees in existing habitat,
- develop a trail plan for the coastal bluffs that will limit pedestrian trampling,
- remove surface layers of organic litter in areas that will be suitable habitat, and
- propagate plants and plant into suitable sites.

Franciscan Thistle. This biennial thistle is currently extremely rare, with fewer than twenty individuals remaining in a serpentine seep along the bluffs above and to the east of Fort Point. Several other suitable serpentine seep habitats occur along the coastal bluffs north of Battery Crosby to Fort Point and to the east of Fort Point above Crissy Field. The population is threatened primarily by invasive non-native plants. Suitable sites for potential expansion are threatened by trampling, invasive plants including naturalized trees, and erosion. Due to low population numbers, this species is threatened with local extinction from chance environmental and biological factors as well.

Enhancement recommendations include:

- remove invasive non-native plants from current population range,
- collect seeds and propagate plants at the Presidio Native Plant Nursery and plant back into area of extant population,
- assess the habitat requirements for this species and potential sites for population enhancement, and
- propagate and plant or direct seed into suitable sites for expansion.

Continue to Implement Restoration and Education Programs

Successful native plant restoration projects have been ongoing on the Presidio since 1994 through the Presidio Park Stewards program. This community-based volunteer habitat restoration program has several elements including curriculum-based education programs with school groups, operation of a native plant nursery, hands-on site preparation and planting, and native habitat restoration, monitoring, and maintenance.

Community volunteers have been invaluable in meeting the increasing number of resource management needs of the Presidio. In the process, a stronger sense of stewardship for public lands and a community advocacy for the park and environment has been created.

The Presidio Park Stewards are successfully conducting several restoration projects at sites throughout the Presidio, including Lobos Creek Dunes, North Baker Beach, the Public Health Services area, Rob Hill, and Inspiration Point. This volunteer program will implement many projects for native plant community restoration, special-status species enhancement, and forest rehabilitation discussed in this plan, including plant propagation, site preparation, planting, and maintenance.

The Presidio Native Plant Nursery has been developed with the assistance of Americorps and the San Francisco Conservation Corps to supply plant material needed for native plant community restoration, as well as historic forest restoration. Without volunteer programs, it would be difficult to undertake resource management projects that have intensive staffing requirements.

Interpretive and education programs are invaluable to restoration efforts by increasing public awareness and acceptance of changes to Presidio vegetation, and encouraging community participation in habitat restoration. On-site resource management personnel and exhibits have been successfully used to explain restoration projects, especially when tree removal is a project component. This on-site resource education program will be continued throughout restoration projects.

Vegetation management activities will provide additional educational opportunities to interpret thousands of years of landscape history and resource use prior to Spanish arrival and relatively recent U.S. military history. Programs will be developed to demonstrate and interpret traditional uses of

indigenous plants and habitats by Native American Indians. Through these programs, the cultural history and contributions of the original stewards of this land (the Ohlones and Miwoks) can be recognized. Changes in the vegetation landscape and uses of the landscape over the entire history of the Presidio can be interpreted through resource management and visitor services programs.

3.3 HISTORIC FOREST MANAGEMENT ZONE

3.3.1 Description of Historic Forest

Forest History

In 1883, Army Major W. A. Jones developed a *Plan for the Cultivation of Trees upon the Presidio Reservation*. This effort stands as the first and relatively rare example of landscape planning on such a large scale for an Army reservation. The impetus may have come in part from the successful example set by Golden Gate Park and other urban parks to develop large urban forests. The plan proposed a major tree-planting program to create a system of windbreaks and to visually enhance the ridges, entrances, and perimeters of the post. The forest would, according to Major Jones, "cover the areas of sand and marsh waste with a forest that will generally seem continuous and thus appear immensely larger than it really is." The forest would serve to increase the visual contrast between the Presidio and the city.

Major Jones' plan specified species to be planted at various locations. They included a large variety of evergreen and deciduous trees and shrubs. Since Major Jones transferred and did not supervise the implementation of his plan, it is unclear how closely mass planting efforts, which began in 1886 by schoolchildren and continued by the Army in 1889 and throughout the 1890s and early 1900s, followed the original plan.

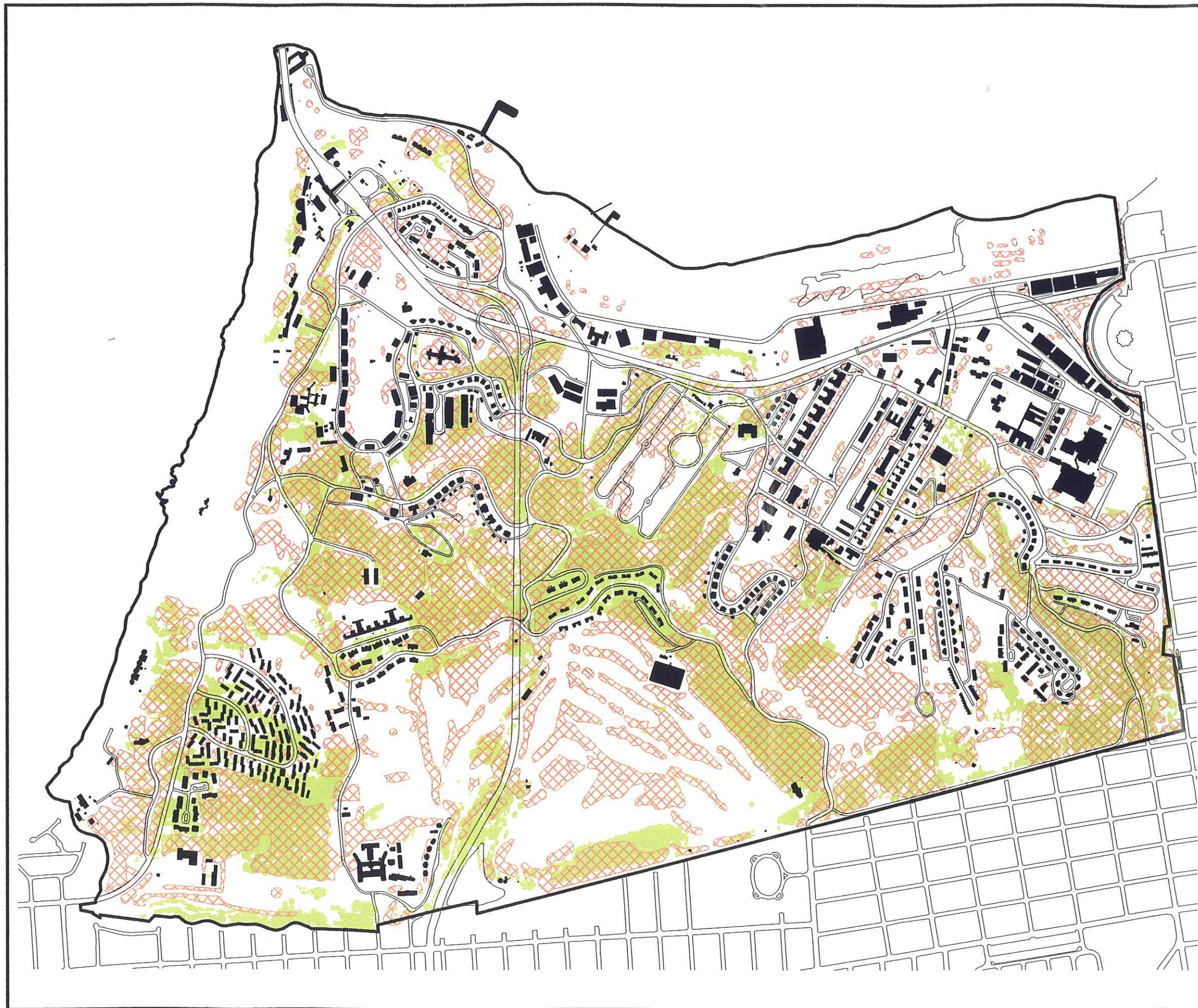
The most commonly planted tree species included blue gum eucalyptus, Monterey pine, Monterey cypress, and blackwood acacia. By the beginning of the 1900s, trees covered approximately 400 acres of the reservation, with much of the forest consisting of densely crowded trees that required thinning.

In 1902, forester W. L. Hall developed a plan for the required thinning as well as additional planting for visual screening and soil retention. During that same year, Major Jones, who had developed the original plan, visited the Presidio and made additional recommendations to beautify it, including thinning of forest stands and planting of a variety of ornamental shrubs and flowers. Large-scale plans launched in 1907 for garrison expansion and construction projects in the post-World War II years reduced the geographic proportions of the forest (Thompson 1994).

Historic Significance of the Presidio Forest. The Presidio was designated a National Historic Landmark in 1962 and listed in the National Register of Historic Places. The Presidio forest is specifically cited in Presidio National Register of Historic Places Registration Forms updated in 1993 as a historically significant contributing resource to the landmark district. (The significant contributing resources are the spectrum of building, sites, structures, objects, and landscapes that contribute to the historic significance of the Presidio.) Afforestation of the reservation is considered the most far-reaching development during the period of Presidio history while the forest was planned and planted (NPS 1993a). The forest established the wooded character and visual quality of the Presidio, which has continued to the present day.

Delineation of the Historic Forest. The area covered by forest trees has shifted over time. The map shown in Figure 6 is based on 1935 aerial photographs and records the actual extent of the forest (both planted and natural) at that time. Even though the date of the photograph is somewhat after the

Figure 6. Historic Forest Extent at the Presidio



Historic Forest Extent (1935)

Forest Boundary 1994

Source: Jones & Stokes Associates, Inc., 1997 and scanned 1935 aerial photographs..



SCALE APPROX 1:12000

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major planting effort and some expansion and shifting of the forest likely had already occurred, it is the best available depiction of the extent of the historic forest (Figure 6). Any early plantings that failed to survive, or forested areas that had already been cleared by 1935 to allow other uses or development are not reflected by this map. The forest as it existed in 1994 is also shown on Figure 6 for comparison.

The historic planted forest of 1935 covered approximately 300 acres of the post, primarily on ridges, along boundaries, and at entrances. The following general observations are made concerning the historical development of the forest.

The forest was planted over a period that extended from 1886 to the early 1940s. Development of the forest generally followed the intent of the plan developed by Major Jones in concept, but actual species planted, locations, and spatial arrangement depended upon availability of plant material, funding, and labor. The forest that we have today is the result of many historic actions to create it as well as dynamic natural forces and natural regeneration that are continually changing the forest.

Maintenance thinning was intended as a long-term maintenance strategy as part of Jones' original proposal, "keeping the distance between trees about equal to their height." This maintenance thinning did not occur.

The forest was designed and planted for its visual attributes and windbreak functions. The primary purpose for the development of the forest was to enhance the Presidio's appearance by converting it to a sylvan landscape. In order to remain faithful to historic context it is necessary to maintain the character-defining appearance of the forest — a forest with a canopy of such a scale that it serves to clearly distinguish the Presidio from the adjacent city.

The Current Forest

Species Composition and Stand Structure. Five species now make up 95 percent of the forest: Monterey cypress, Monterey pine, blue gum eucalyptus, blackwood acacia, and coast redwood. While three of these species, Monterey cypress, Monterey pine, and coast redwood, are native to the

California central coast, they have not occurred in San Francisco for thousands of years and therefore none of these trees are considered native to this area. When the Presidio was planted, most stands were planted with even spacing and only one species in each planted area. Single species (or monotypic) stands still prevail; however, several stands now exhibit some tree species diversity.

Eucalyptus stands dominate the Presidio forest, covering 42 percent of the forested acreage. Monterey cypress stands occupy 34 percent, while Monterey pine and mixed-species stands occupy 17 percent (Jones & Stokes Associates, Inc. 1997). The remainder of the historic forest consists of small areas of planted acacia and redwood. Mowing or dense canopy shading has limited the understory of most Monterey pine and Monterey cypress stands. Groundcover varies under eucalyptus and Monterey pine and includes mostly non-native grasses, forbs, vines, and occasional native shrubs and small trees.

Some reproduction is occurring within the introduced stands. As most of the forest was planted during a relatively short period, much of the forest is of a single age class (or even-aged). Eucalyptus stands were originally even-aged, but because sprouting occurs, many stands are evolving into uneven-aged stands. Where Monterey pine and Monterey cypress have naturalized and expanded into treeless areas, including many native plant communities, the stands exhibit an uneven-aged character.

Reproductive Patterns and Natural Regeneration. Natural regeneration within planted forest stands has been limited, but does occur under certain conditions. The dominant trees of the introduced forest exhibit varying degrees of regeneration based upon species characteristics and site conditions.

Monterey cypress and Monterey pine are fire-responsive species that reproduce most successfully in their native environments after a fire. Heat from the fire opens the cones to allow seed release, bares mineral soil for seed establishment, eliminates competing vegetation, opens the canopy to admit full sunlight, and optimizes reproductive success. In the absence of fire, as is the case at the Presidio, reproduction of these species is slower and more modest, but does occur as evidenced by the spread of young pine and cypress into natural areas adjacent to planted forest stands and along roadsides.

Blue gum eucalyptus and blackwood acacia readily reproduce both under a canopy and in available openings. Both species can regenerate either from seed or by sprouting from stumps and roots and have expanded from their original planting sites and colonized new areas. Redwoods reproduce by stump sprout or seed germination.

Forest Health and Condition. As the forest ages, the trees that were planted in the late 1800s are reaching the ends of their normal life spans. Because much of the planted forest is approximately the same age, the forest has matured uniformly, and a period of much slower growth and possibly high mortality is beginning in the cypress and pine stands.

The three primary tree species all have rapid initial growth, but are relatively short-lived. The life span of Monterey pine is 80 to 100 years, while the life span of Monterey cypress ranges from 100 to 150 years or more. Although subject to large-limb breakage, dieback of the crown, and blowdown after the age of 80 years, blue gum eucalyptus can continue to live much longer and often resprouts when it does fall or break.

Because of the advanced age of most trees, breakage and tree death could substantially reduce the extent of the forest over the next 20 years (Jones & Stokes Associates, Inc. 1997). Damage from storms is also expected to accelerate as the trees weaken. For example, in December 1995 a storm resulted in numerous windthrown trees near the Presidio Drive gate in the southeast portion of the Presidio. The decline in forest health is probably the result of several attributes of the planted forest - the choice of short-lived trees, overstocking without adequate maintenance thinning to a healthy density level, and the lack of forest openings that would allow more natural regeneration.

The experience of Golden Gate Park may portend a parallel but slightly delayed future for the Presidio forests since the two areas have similar site conditions, weather, and soils. Planting of similar tree species began in the 1870s in Golden Gate Park (approximately two decades before major Presidio planting). Over the last 10 years windfall from destructive storms has increased. Extremely hard-hit have been Monterey pine and Monterey cypress in the western portions of the park. A reforestation program has been in place since 1980 to replace dead and storm-damaged trees.

In much of the Presidio forest, corrective measures such as thinning are no longer effective. At this point it is too late in the life cycle of the Presidio's trees for individual thinning of overstocked areas to be beneficial, since this could increase wind effects in other parts of the stand and would not release the trees from their stagnant formation.

Pest and Disease Threats. Two new pests pose serious threats to the Presidio forest: an insect, the eucalyptus longhorn borer, and a fungal disease, pine pitch canker. As of this writing, neither of these pests have been detected in Presidio forests. However, they have infected trees in nearby areas and have the potential to kill large numbers of trees.

The eucalyptus longhorn borer is a serious pest of eucalyptus trees. Trees stressed by drought or soil nutrient deficiency or recently cut or fallen trees and branches are most commonly attacked. If this insect enters the Presidio's older eucalyptus forest, significant losses could occur. The eucalyptus borer has been found in nearby Contra Costa, Santa Cruz, and Alameda counties. Research is being conducted that may lead to effective controls for this pest (such as a prey-specific predator) in addition to sanitary wood disposal practices.

Following an outbreak of the pine pitch canker in California 1986, this disease has been identified at several locations in the San Francisco Bay area including nearby Golden Gate Park and Marin County. Although recent inspections have not detected this disease in Presidio forests, it can be assumed that the pine pitch canker will eventually be found here. Some Monterey pines are relatively resistant to the effects of the pine pitch canker but the source of the resistance is poorly understood. Insects may eventually kill severely infected trees. Currently this disease cannot be effectively controlled.

3.3.2 Proposed Management Actions

Objectives for Management of Historic Forest Management Zone

Management of the historic forest will be guided by the following objectives.

- *Maintain the forest within the historic forest management zone as a significant historic landscape feature, a setting for historic buildings and events, and a historic landscape design by the Army.*
- *Maintain the windbreak function of the historic forest and the appearance of the forest canopy that differentiates the Presidio from the adjacent city.*
- *Preserve live, healthy trees within the historic forest management zone.*
- *Preserve historic planting configurations in a few key and highly visible historic forest stands.*
- *Rehabilitate the aging forest within the historic forest management zone and manage it to become more self-sustaining by increasing structural and species diversity and encouraging natural regeneration.*
- *Protect and enhance valuable forest wildlife habitats and avoid adverse habitat impact in rehabilitation activities.*
- *Select replacement tree species to meet specific needs (for example, to reduce canopy height of forest trees adjacent to specific neighboring communities or to provide buffers between historic areas and native plant communities).*
- *Manage the forest to maintain the historically identified views from Inspiration Point and Rob Hill and other important visual connections.*

It is likely that the mature forest is entering a period of decline where an increase in the rate of tree death from storms, disease, and old age can be expected. These events and the processes of natural succession could greatly change the character of the forest. Management actions will seek to preserve and rehabilitate the historic forest within the historic forest management zone, and increasing the degree to which the historic forest can be managed as a healthy biological community.

The proposed management actions that follow recognize that the forest is a historic resource that will be managed in accordance with standards for treatment of historic properties. As a historic resource it

is desirable to preserve the mature healthy trees for as long as possible and to retain the character of the forest over the long term. In addition, natural events and processes (such as windstorms, ecological succession, and natural regeneration) will play an increasing role in management of Presidio forests, and natural events and processes can be used to assist in forest rehabilitation.

Apply Rehabilitation Standards to Treatment of Historic Forest

Any forest treatment must recognize the significance of the forest as a historic resource. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (NPS 1996a) have been applied to assist in the selection of appropriate forest treatment. The standards for rehabilitation and guidelines for rehabilitating cultural landscapes are the most applicable for treatment of the historic Presidio forest. The guidelines offer the following definition of rehabilitation treatment.

Rehabilitation is the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions of features which convey its historical or cultural values.

In rehabilitation, a cultural landscape's character-defining features and materials are protected and maintained as they are in the treatment Preservation; however, a determination is made prior to work that a greater amount of existing historic fabric has become damaged or deteriorated over time and, as a result, more repair and replacement will be required. The Standards for Rehabilitation and Guidelines for Rehabilitation allow the replacement of extensively deteriorated, damaged, or missing features using either traditional or substitute materials. (NPS 1996a)

The rehabilitation guidelines are appropriate for application to the Presidio historic forest because they emphasize continuity through preservation of features that convey historical values. At the same time, the guidelines recognize that change may have occurred. The guidelines allow for replacement, when necessary, with like kind of plant material in composition, form, and habitat, or, if that is not feasible, with a compatible substitute.

The rehabilitation guidelines are interpreted, with relationship to management of the Presidio forest as a historic resource, as follows:

- The healthy forest trees within the forest management zone will be preserved with the recognition that the forest is a living, and therefore constantly changing, historic component.
- Rehabilitation and replacement of damaged portions of the forest will be necessary to counteract the effects of nature's forces and old age. Historically planted species (Monterey pine, Monterey cypress, and eucalyptus) will continue to exist in the historic forest. In areas where use of historic species conflicts with sustainable management practices, or where important views have been lost over time, other trees species will also be considered for replacement use to retain the general character (form, scale, and appearance) of the forest.
- While many of the original forest stands were planted as even-aged, one-species stands, it is infeasible without cyclic clearing and replanting to maintain such a forest over the long term. Except in designated character-defining areas (key historic forest stands — see Figure 3), the forest will be managed so that it becomes more diverse in age and species.

- Any use of replacement species that was not historically planted to address specific management issues will be thoroughly tested in order to evaluate the compatibility of character and appearance with historically planted species as well suitability for this site.

Historic Forest Character and Treatment Study (Historic Forest Study) A Historic Forest Study will be conducted by the NPS's Olmsted Center for Landscape Preservation, or an affiliated group, to document, analyze and evaluate the characteristic features inherent in the historic forest using the Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. This focused study will be completed to better define the parameters of rehabilitation and diversification allowable within the forest, while ensuring its continuing role as a contributing element of the Presidio's National Historic Landmark. This Study will identify the vital elements or "fabric" inherent to the forest's historicity that must be maintained. The study process will recognize the unique nature of assessing historic significance and integrity in a dynamic biological system in its findings. The study recommendations will help further refine the following rehabilitation concepts for the historic forest to determine its ultimate composition and character.

Concepts for Rehabilitation of the Historic Forest Management Zone

Most of the historic forest will be managed to incorporate attributes of a diversified biological community in order to reduce maintenance needs and management costs and enhance the value of the forest as habitat for native species. Over time, the majority of forest will be incrementally changed to mimic a more natural forest by including:

- a range of ages from seedlings to dead snags,
- a variety of tree densities and spatial configurations,
- a multiple-layer canopy structure,
- greater species diversity, and
- conditions that encourage natural regeneration.

Encourage a Range of Ages. With all age classes and more than one species represented, it will be less likely in the future to have entire stands in decline. The age structure of the forest will be diversified by encouraging natural regeneration in small openings and conducting replacement planting of small areas over the long term (up to 50 years). In less visible areas away from trails and visitor use areas, consideration will be given to allowing senescent and standing dead and fallen trees to remain as wildlife habitat as long as disease potential is not increased or visitor safety is not threatened.

Develop a Variety of Densities. The Army's original plan called for thinning to reduce problems of overstocking as the plants grew. Unfortunately, this maintenance thinning was not accomplished and in many forest stands tree density is 400 to 500 trees per acre.

A commitment must be made to properly thin new plantings in the future so that seedlings can grow into healthy trees. The maintenance of original spacing (and tree-for-tree replacement) is only appropriate in the few key historic forest stands described below. The forest of the future should contain some groves of trees and some irregularly shaped small openings that will allow understory plants and natural tree regeneration.

In the experience of managers of Golden Gate Park, tree vigor is highest where mature tree density is between 30 and 50 trees per acre. When density is above 100 trees per acre, stand vigor decreases (State of California 1980). While site conditions and tree species planted differ somewhat between the forests of Golden Gate Park and the Presidio, it can be assumed that a much lower mature tree

density (100 trees per acre or less) would be beneficial to the health and vigor of the Presidio forest of the future.

Develop a Multiple Layer Structure. The development of mid- and under-stories will enhance wildlife habitat potential. Many forest stands are comprised entirely of a high forest canopy with no understory, or a weedy non-native understory. A mixed forest of a variety of ages will increase structural diversity, as will the development of an understory of native grasses, herbs, shrubs, and small trees where openings to allow sunlight can be created and maintained.

Increase Species Diversity. Historic species will remain dominant in most historic forest stands as natural regeneration occurs in openings created by storms and the death of older trees. A mixture of the primary forest tree species (rather than only one species) will be encouraged. For example, in forests now dominated by Monterey cypress, Monterey pine might also be planted as the opportunity and site conditions allow. In existing eucalyptus stands where other species are present in the understory, natural and storm-created openings will be enlarged to allow regeneration of other tree species and understory vegetation. Irregular small openings should be left to encourage native plants in the understory of the historic forest and natural regeneration of forest trees.

Suitable areas for reintroduction of native trees and other native species within openings in the forest and in transition areas between historic and native plant communities will be identified.

Explore the Development of Native Species Buffer Areas. To reduce the need for containment efforts and to increase forest species diversity, especially where a historic forest management zone is adjacent to a natural area, establishment of transition or buffer areas at the edge of the forest zone will be considered. These transition areas could consist of a mixture of native trees and large shrub species (such as live oak, wax myrtle, madrone, toyon, California buckeye, yellow willow, and arroyo willow). The buffers will provide a flexible management "line" 50 to 100 feet in width. Specific planting plans for buffer areas will be guided by both the Historic Forest Study and site-specific ecological restoration action plans. The purpose of such buffer areas will be to:

- reduce management, maintenance, and containment efforts for non-native trees species and allow better protection of existing native plant communities,
- increase habitat diversity and wildlife habitat potential, and
- allow light penetration into native plant communities by decreasing vegetation height adjacent to native plant communities.

The buffer areas are not appropriate along the edges of "key historic forest stands" because this type of management would alter their historic character and appearance (see the subsection Preserve Key Historic Forest Stands Through Intensive Management, below).

Enhance Conditions to Increase Natural Regeneration. Whenever possible, rehabilitation efforts within the historic forest management zone should seek to create opportunities to allow the occurrence of natural regeneration of Monterey pine, Monterey cypress, and eucalyptus. Natural regeneration appears more likely to occur in the following circumstances:

- when there is a forest litter layer or grass cover,
- along the edges rather than within stands,
- in small openings where there is more light, and

- where there is more soil moisture from fog drip lines of mature trees.

Monitoring will be undertaken to allow systematic assessment of the actual importance of a variety of soil and other site conditions and seed release and dispersal factors that may affect regeneration, but are of unknown significance. Where natural regeneration occurs, seedlings are likely to be stronger with better root development than nursery stock. Genetic continuity with historic stock will also be assured.

Consider Wind Effects in Forest Rehabilitation. One of the reasons the historic forest was planted by the U.S. Army was to provide a windbreak, presumably to provide wind shelter for the human occupants of the post. Trees were planted on ridgetops and west of developed areas to dissipate wind energy from heavy onshore winds and to reduce blowing of shifting dune sand. The western areas of the Presidio along the ocean coast are most strongly affected by high winds, especially the forests between Baker Beach and Lincoln Boulevard.

In ridgetop forest stands, rehabilitation efforts will consider the possible effects of wind. When planning rehabilitation projects, the potential for additional windthrow might be minimized by designing small rehabilitation area sizes (0.3 to 0.5 acre in size) to minimize the potential for additional windthrow. Forest opening size and configurations will depend largely on the effects of storms, but when storm-damaged trees are cleared to prepare a site for rehabilitation, the effect of wind on regeneration success and windbreak functions will be considered. Clearings will generally be oriented perpendicular to the prevailing wind in a southwest-northeast direction.

It is important to note that upwind natural areas at Lobos Dunes, Baker Beach, Wherry Housing, and Public Health Services North sites might actually require wind to sustain natural processes in dune communities. Forest rehabilitation efforts must consider the need to continue these natural processes.

Preserve Key Historic Forest Stands Through Intensive Management

Stands in four highly visible locations will receive intensive management measures in order to preserve their existing character as long as possible (see Figure 3, Vegetation Management Zoning Map for the Presidio). These stands are:

- eucalyptus stand bordered by Presidio Boulevard and Lovers' Lane,
- Monterey cypress stand between Arguello Boulevard and the golf course,
- the northernmost Monterey cypress stand of the ridge windbreak system near the Old Cavalry Barracks and south of the stables, and
- Monterey cypress, eucalyptus, and Monterey pine stand at Colby Avenue adjacent to and east of Lincoln Boulevard and the World War II Memorial.

In these key areas, the historical plantings were kept evenly spaced, mowed, and carefully maintained by the Army. These particular stands have historical values that will be disrupted by replacement planting and young trees since they are now comprised of mature, evenly spaced trees with a high canopy, little branching, and no understory. This configuration lends a special character to the stand that cannot be retained over time through rehabilitation efforts and will eventually be lost.

In these few key areas, special efforts will be made immediately to care for the trees and maintain them as long as possible. Preservation efforts will be under the direction of an arborist so that any

necessary pruning and other maintenance care can be undertaken to extend the lives of trees in these areas as long as possible. As trees within these stands die, become damaged, diseased, or insect-infested, they will be promptly removed, but not individually replaced. These stands will retain their historic character for some time, even with some trees missing.

In the two Monterey cypress stands, a threshold of tree loss will eventually require stand regeneration. When approximately 40 percent of the trees in any small area have been removed, other decadent trees will be removed and a small portion of the stand will be replanted with Monterey cypress. Regeneration area sizes will generally be maintained at the 0.3- to 0.5-acre size to avoid initiation of additional windthrow, maintain windbreak function, and limit visual impact, but also to allow adequate light to reach the ground for vigorous seedling growth. In some locations, where consistency of age class over a larger area is required to maintain the forest's historic character, larger regeneration area sizes may be employed.

In general, the width of forest openings should be twice the height of surrounding trees to allow sufficient light penetration. Opening configurations will depend upon site-specific considerations and visual impacts, but will generally be oriented with the long dimension perpendicular to the prevailing wind in a southwest-northeast direction. Over time, the key historic stands will be regenerated using the historic spacing and configuration, recognizing that once regeneration has been initiated, the appearance of the stand will change significantly. Phasing of tree removal will be coordinated to reduce visual and resource impacts.

Eucalyptus sprouts from its base when cut. Sprouts from cut trees will be selectively controlled through hand pruning to provide replacements for the eucalyptus trees that are removed. Although the visual grid appearance of the stand will be somewhat altered through eventual rehabilitation, the orderly appearance of the historic stands could largely be retained.

Substitute Historically Planted Species

In several situations, species that were historically planted may require substitution with other species or pest-resistant strains of the same species. Consistent with the findings of the Historic Forest Study, any substitute species considered for planting in the historic forest (for example, other species of cypress or eucalyptus) or in historic landscape areas will be tested through pilot projects to assess its ability to survive site conditions and evaluate physical appearance and characteristics.

Replacement for Pest Resistance. It is premature to recommend management actions to deal with pests such as pine pitch canker and eucalyptus longhorn borer because they have not yet affected Presidio forests. Periodic monitoring and seasonal inspection is ongoing to detect disease and pest problems at the earliest possible stage. No serious disease problems currently exist. If a serious disease does occur, a professional forest pathologist will immediately evaluate it and a course of action will be taken based upon the park integrated pest control program. Cultural treatments (including soil amendments, pruning, sanitary cleanup of diseased wood), replanting with genetically resistant species, use of prey-specific natural predators, and other treatments that are effective against the specific pest will be considered at that time. In the meantime, historically planted tree species including Monterey pine and blue gum eucalyptus will be maintained in historic forest areas.

Replacement for Height Modification. Monterey cypresses growing along the southern boundary of the Presidio, adjacent to Julius Kahn Playground have been regularly topped for over 50 years by homeowners. Topping to reduce tree height maintains the views to outstanding visual features of the San Francisco Bay and Golden Gate Bridge from homes adjacent to the Presidio. As a result, the trees in this area are now flat topped, intertwined with irregular side branch growth, and unnatural in appearance. The rehabilitation of the topped forest adjacent to Julius Kahn playground will require

special consideration to honor the historic design intent while also improving the health of the trees in this area. Thinning of existing Monterey cypress or individual replacement of the dead trees will not be effective in most of this area because intertwining branches and close spacing prohibits individual tree removal. It will therefore be necessary to replace the trees in blocks. Irregularly shaped blocks will be cut and replaced in a staggered pattern so that not all trees will mature at the same time. In areas where remnant native dune scrub vegetation is present (just east of Julius Kahn Playground), scattered canopy openings will be allowed to remain to protect pockets of native species.

The soils in this area are derived from dune sands, and while Monterey cypress has grown successfully, many other tree species may not survive. Several cypress species that are shorter and are native to central California will be tested for suitability as a replacement species, based upon appearance, growth form, and performance at the Presidio. Consideration would be given to McNab, Sargents, Santa Cruz, and Gowen cypress. Following experimental planting and evaluation of their form and appearance, one or more of these species will be selected as a compatible substitute for the taller Monterey cypress in this area.

Some eucalyptus stands, including those bordering Lyon Street on the southeast, have been topped in the past. However, this practice was not consistently employed over a long period of time as it was at Julius Kahn Playground. Topping of eucalyptus produces unhealthy trees with rapid-growing sprouts at each cut, resulting in distorted tree form and an increase in hazard potential from falling limbs. Because of this, topping will not be used as a forest management practice in these eucalyptus stands. Instead forest management in these areas will focus on remedial pruning to mitigate for past topping. However, in areas where blue gum eucalyptus requires replacement due to safety concerns or senescence and where height reduction may be desirable, other lower growing, less hazardous, and less invasive species of eucalyptus may be used consistent with the findings of the Historic Forest Study. Potential replacement species such as coral gum, red spotted gum, and flooded gum will be tested to find a suitable alternative. Other small trees (such as coast live oak) that are native to the Presidio could be tested to determine their suitability in this habitat. Following experimental planting in the Presidio and evaluation of their form and appearance, one or more of these species will be selected as a compatible substitute for the taller blue gum.

Process for Site-Specific Rehabilitation of Historic Forest Stands

The concepts discussed above will be applied as opportunities and priorities for rehabilitation are created by natural events and storms, as well as through identified management needs. Storms and natural events have required forest cleanup and rehabilitation in the past (for example the Presidio Gate area in 1995) and the frequency of such events is expected to increase. An interdisciplinary vegetation management team will select specific areas for forest rehabilitation as storms and fallen trees create openings and then develop site-specific forest recommendations for an annual rehabilitation program. Selection of forest rehabilitation sites based upon storm damage will most likely result in a random pattern of forest rehabilitation and will mimic natural processes.

Forest management decisions will be made by the vegetation management team on a case-by-case basis following on-site inspection, a review of resource information and site conditions, and consideration of appropriate vegetation management treatment options found in the Jones & Stokes Associates, Inc. (1997) report. For example, an annual program might consist of a rehabilitation project for forest areas that have windfall damage from a winter storm, existing openings in a forest wind break that require replanting, and several native habitat restoration areas. The group would consist of at least three to four professionals with expertise in the following areas:

- forestry/arboriculture,
- landscape architecture/historic landscapes,
- grounds maintenance, and
- natural resource management.

The team will jointly evaluate the site and make recommendations for treatment of each area based upon field review and consideration of a variety of factors, including the following:

- Size and boundary of the affected area,
- Whether the area is part of the historic forest or part of a key visible forest stand,
- Previous forest condition (including species of trees, their size, age, and configuration),
- Whether the area is an important windbreak forest stand,
- Natural regeneration potential,
- Significant natural elements or cultural features that must be protected (wildlife values, critical plant and animal habitat, presence of native species, archeological resources). The biological evaluation described in the subsection Restore Native Plant Community of Section 3.2.1 also apply,
- Erosion problems that require correction,
- Options for forest treatment (referring to Forest Management Decision Matrices in Jones & Stokes Associates, Inc. (1997)),
- Existing and planned use of the area,
- Views (historic views, vista points, the need for visual screening),
- Maintenance concerns (access, ability to provide irrigation), and
- Other concerns or requirements (setback requirements, proximity to neighboring residential areas, changes in forest windbreak, etc.).

The recommendations of the vegetation management team will include:

- Specific instructions for clearing trees or windfalls (considering access for equipment, other trees that may need to be removed due to damage or hazard potential, any fencing necessary to protect native plants, wildlife habitat, special-status species, or archeological resources).
- Schedule to conduct work (considering any wildlife and nesting impacts, seasonal rainfall, visitor use patterns, and impacts to neighbors). Forest rehabilitation areas will be treated and replanted as soon after clearing of dead and down trees as possible (when feasible, within one year). Areas targeted for restoration to native plant communities will be revegetated as expeditiously as resources permit.
- Work areas to be closed to the public for safety and avoidance of noise impacts. Tasks that

typically generate high noise levels, such as wood chipping, will be conducted at less intrusive areas or moved offsite whenever feasible and will be limited to daylight and weekday hours and will be scheduled to minimize noise impacts for visitors and residents.

- Training for work crews to avoid trampling native vegetation, effectively salvaging native or important horticultural plants, avoiding soil compaction or accelerating site erosion.
- Site preparation and planting plans (species to be planted, and planting configuration).
- Erosion control measures (such as mulching, grass seeding, netting, or drainage repair).
- Care recommendations (including irrigation systems and schedule, thinning, any necessary signing or fencing for visitor control).
- Other considerations (safety, rehabilitation of visitor facilities such as trails parking areas, or viewsites).
- Public review and comment when appropriate.

Maintain Vistas and Historic Views

The striking views of the Presidio from Marin Headlands, the Golden Gate Bridge, and the bay are largely visual impressions of a natural sylvan landscape as a result of the continuous Presidio forest canopy. This visual impression will be preserved through historic forest rehabilitation.

Some of the historic scenic views from the Presidio to nearby landmarks such as the Golden Gate Bridge, Marin headlands, Angel Island, Alcatraz, the Palace of Fine Arts, the city skyline, and panoramic views of the San Francisco coastline have been obscured by naturalized forest stands. In the original afforestation plan, summit vista points were left unplanted and lower-growing native vegetation allowed uninterrupted views of the ocean and the bay. Over time, trees have been planted or have naturally expanded into these designated vista sites and have blocked some of these views.

Important viewpoints shown on Figure 7, Viewpoints and Vistas to be Restored, include Inspiration Point, Rob Hill, vistas along Lincoln Boulevard and coastal defense batteries, and Golden Gate Bridge viewing area.

Non-native vegetation will be modified, cleared, or maintained as needed to retain these scenic viewpoints and important visual connections (such as the historic visual link between Infantry Terrace and the Main Post). In most cases, native plants of lower stature (forbs, grasses and low shrubs) will be planted at the view sites so that native communities can become established and the view sites can more easily be maintained. In the case of views from historic coastal gun batteries, low-lying native plants may be planted but the viewshed will be managed as landscape vegetation. This will allow height alterations to be made if shrubs begin to obscure these important historic views.

Recycle Plant Material and Market Wood

Vegetation debris and woody material of a variety of sizes will require reuse and disposal. Plant material will usually be removed, rather than allowed to decompose naturally since much of the Presidio is highly visible and intensively used by visitors. In a few areas within the historic forest management zone, standing dead or downed limbs and trees will be allowed to decompose naturally to enhance wildlife habitat if they do not harbor pests or diseases that can affect other Presidio resources nor create a fire hazard.

Figure 7. Viewpoints and Vistas to be Restored



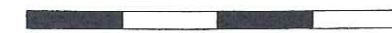
↑ Historic View Restoration

Source: Jones & Stokes Associates, 1997; NPS, Presidio Trust, 2001.



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Over time, it is anticipated that the volume of wood waste will greatly increase. A sustainable vegetation disposal program will be developed to ensure that organic debris is recycled and reused and that fair market value is recovered. The disposal program will include waste material and forest products generated during hazard mitigation, native plant restoration, forest management activities, and fuel reduction.

Vegetation debris and forest products have many possible uses, depending upon size, quality, species, and volume of the material. Tree limbs and smaller trees can be chipped, either on-site or at a central location, and the material can be recycled for use as mulch at forest rehabilitation sites and in developed areas with landscape vegetation. Mulch in excess of needs within the Presidio and Golden Gate National Recreation Area may have commercial value and could offset some of the costs of resource management efforts and landscape maintenance.

When large trees are removed because they are hazardous, standing dead, or windthrown, they may have commercial value. The closely planted trees of the Presidio are often straight and tall with little lower-trunk branching. These characteristics enhance the commercial value of the Presidio's Monterey cypress and may make it desirable as sawlogs and peeler logs for use as lumber and veneer, respectively.

Market values and the species that are desirable for an expanding variety of wood products are constantly changing. At the time of tree removal, the market value should be evaluated to determine whether it is economically feasible to utilize the available wood as logs, pulp chips, firewood, or fuel. In the meantime, markets for wood products should be investigated and developed so that compensation for products can be maximized. Economic needs and harvest value will never be the primary reason for tree removal or harvest.

The opportunity for development of a small business that cuts, splits, sells, and delivers firewood offers the potential to offset some of the annual operating costs of vegetation management, employ local labor, and provide a revenue source. Firewood, in contrast with other methods of wood utilization, has relatively low site impact and requires only small- to modest-sized equipment. It also responds to sustainability principles by allowing recycling of wood products in the local area.

Develop Multi-Agency Cooperative Agreements

Several agencies with land management responsibilities are now dealing with issues related to tree removal, replacement planting, and wood utilization. By pooling resources and working together, these agencies may be able to realize cost savings, decrease site impacts, and identify market interest in wood products. Because larger combined volumes of wood products will be available at one time, market interest from mills and the potential to recover fair market value for wood products will increase.

The development of a multi-agency agreement should be explored between the City and County of San Francisco (Recreation and Park Department) as manager of Golden Gate Park, State of California (Department of Parks and Recreation), the Trust, and National Park Service, and other interested agencies and municipal districts in the San Francisco Bay Area that manage forested areas. The agreement could include provisions to:

- share costs for purchase of expensive specialized equipment for tree clearing, log moving, and chipping,
- develop a skilled crew familiar with low-impact logging techniques suitable for use in park areas,

- develop and maintain market channels for wood products,
- share revenues for sale of wood products, and
- develop planting stock sources or a cooperative nursery.

Evaluate Cost Effectiveness

Effective rehabilitation of the historic forest will be incremental, and therefore will take place over a long period of time. The diversification of the forest to a multi-layered and multi-species forest could realistically take place over a number of decades. A continued planning process, assessment and revision over time is necessary.

Management of the historic forest requires an experimental approach — resource managers are likely to learn as they go. The plan has incorporated the flexibility to test new tree species to address specific situations, and to incorporate new knowledge and management techniques as they are developed by experience at the Presidio and in other similar areas. A long-range goal is to develop a self-sustaining forest where trees within the historic forest management zone can be perpetuated indefinitely with minimal maintenance cost. Long-term monitoring of all actions and their effects, and review of situations in similar forest areas will be needed to refine management concepts.

As the forest changes due to natural events and forest rehabilitation, this plan and its cost effectiveness should be evaluated. These proposed management actions within much of the historic forest is based upon a conservative approach to preserve some historic forests as long as possible, rehabilitate following storm damage as opportunities arise, and monitor. More aggressive action may eventually be required. After 5 years, and again after 10 years, a thorough review should be conducted. These evaluations should consider:

- changes in the number and size of windthrow areas,
- progress in moving toward more uneven-aged stands,
- experience gained from management of the Presidio forest as well as experiences of other land managers of similar forests, and
- past and estimated future costs of forest maintenance.

Adjustments should be made following public review after each 5-year period. If large-scale windthrow patterns of many acres are detected or if the forest is dying in large blocks as a result of senescence or insect infestation, a plan that incorporates small selective cuts may need to be considered to move from reactive to more proactive forest rehabilitation.

3.4 LANDSCAPE VEGETATION MANAGEMENT ZONE

3.4.1 Description of Landscape Vegetation

The designed landscapes of the Presidio provide a rich cultural context and a unique historic sense of place that sharply contrast with the Presidio's forests and native plant communities. Ornamental plantings played a significant role in the design of these landscapes and the functional evolution of developed sites.

Much of the Presidio's landscape vegetation was planted during periods of historically significant development, and some plantings have been present for one hundred years or more. As a result of this long and rich planting and design history, many species have historic interest as heritage species or may be horticultural species that are no longer commercially available. These plantings unify the various developed sites and buildings and reinforce the role of the Presidio landscape as an essential component of National Historic Landmark designation.

In addition to beautifying the post and contributing to the unique historic setting of the Presidio, the vegetation used for landscaping also serves a wide variety of management functions. Ornamental shrubs, trees, lawns, and groundcover provide vegetative screening, visual accents for developed sites, and physical delineation for specialized uses.

3.4.2 Landscape Vegetation Management Categories

Designed landscapes within the Presidio can be described by grouping them into management categories based upon their design intent, character, function, and location. Management and maintenance will vary somewhat for each of the following landscape vegetation categories so that their distinctive functions can be retained. However, the general principles and management concepts presented in Section 3.4.3, Proposed Management Actions, will apply to all categories.

Buildings with Formal Landscapes

Landscaped areas around buildings at the Presidio are typically characterized by manicured low plantings and lawns that allow a clear view of the building from the street and clear sight lines from the building to distant views. Landscape designs of plantings associated with historic buildings favor regular, rectilinear arrangements. Many of these landscapes associated with buildings have changed significantly over time from their original design intent and have been overgrown, lost, or significantly altered. Maintenance of these plantings varies depending upon their function but typically requires watering, fertilization, mowing, edging, weeding, pruning, and periodic replacement of overgrown, dead, diseased, or hazardous vegetation.

Types of buildings with formal landscape vegetation characteristics include:

- *Administration/Community/Commercial Facilities.* These public use areas have maintained lawns and groundcovers, flowering foundation planting or low hedges, and occasional specimen trees.
- *Industrial/Maintenance Buildings.* These utility areas have minimal utilitarian landscaping with shrubs for screening and fences for security and separation.
- *Residential Buildings.* Front yards are characterized by maintained grass lawns continuous with one another, occasional specimen trees, and continuous foundation plantings of low flowering shrubs and flowers. Back yards consist of maintained grass, some low border chain-link fencing with ivy or hedges pruned 3 to 6 feet high, and foundation plantings continued from front yards.

Open Space and Play Fields

The Presidio contains a variety of recreational play fields including traditional ball fields, informal open grassy areas, and soft-surfaced playgrounds with equipment. Vegetation other than grasses is minimal. Parade grounds at Ft. Scott and the Main Post were traditionally expansive open grassy areas, but the parade grounds at the Main Post are now mostly paved and used for parking.

Landscape Screens

Vegetative screens serve a variety of functions including separation between public use and residential spaces, visual screening of non-historic features and utilities, a buffer from highway noise and lights, and wind screens. Landscape vegetation must be retained at the proper height, density, and maturity in order to function as an effective screen or buffer. Important segments of forest and large shrub screens that will be maintained for visual screening include landscape vegetation along Doyle Drive, at the intersection of Doyle Drive and Highway 1, at the Golden Gate Bridge toll plaza and maintenance areas, and along Lincoln Boulevard near Doyle Drive and near Fort Scott. Where there is a need for vegetation screens and buffers, the park landscape architect and natural resource specialist will identify the appropriate vegetation to be used based upon the location, the existing vegetation species found in the general vicinity, and other pertinent selection criteria.

Road Corridors

Road corridors traverse all three vegetation management zones. Of special concern are scenic and historic vista points along road corridors and gateways entrances into the Presidio.

Vista point openings along road corridors were historically left unplanted during afforestation to maintain scenic views of the ocean and the bay. As stated in Section 3.3, Historic Forest Management Zone, these important viewpoints and historic visual links will be maintained, in most cases by establishing and maintaining native plant communities that are generally lower and do not obscure important views.

Gateway entrances were characteristically planted in formal arrangements. Design elements vary at each gate but include the use of sentinel trees, hedged alleyways, flowering shrubs, and open areas of lawn or ground cover. No two gateway plantings are alike, but all were designed to provide a sense of arrival and to contrast with private lands outside the gates.

Coastal Fortifications

Earth sheltered batteries were typically kept open to the front with low grasses and ground cover and camouflaged from view to the rear with informal plantings of shrubs and trees. While considered to be part of the landscape vegetation management zone, these areas have significant habitat for native plants.

Landscaped Areas Managed by Other Agencies

National Cemetery. Managed and maintained by the U.S. Veterans Administration, the cemetery is well tended with formal plantings of mowed lawn, specimen trees, and pruned hedges.

Golf Course. The golf course is managed and maintained by concession agreement. Typical of a golf course, the area includes highly maintained greens, fairways, and rough grasses of various textures and heights, with trees placed strategically and managed as dividers, hazards, and markers. The Concessionaire is currently developing a vegetation management plan in conjunction with the goals and strategies outlined in this document.

Golden Gate Bridge Plaza. This area is managed and maintained by the Golden Gate Bridge District as a view plaza and overlook with seasonal flowerbeds, groundcovers, and low, flowering shrubs.

3.4.3 Proposed Management Actions

Objectives for Management of Landscape Vegetation

The following broad objectives will guide the management of the Presidio's designed landscape vegetation:

- *Maximize sustainable practices in plan development, implementation, and maintenance of landscape vegetation projects,*
- *Identify, document, and map historic and existing landscape plantings and plant species,*
- *Retain existing historic landscapes and historic plants whenever feasible,*
- *Select appropriate plant material for replacement vegetation considering historic plant use and design intent, function, potential impacts to native plants, and sustainability,*
- *Identify and treat hazardous tree conditions, and*
- *Identify and maintain heritage landmark trees.*

Based upon *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (NPS 1996a) and the objectives identified in the GMPA for historic landscape resources, the most appropriate treatment for most of the Presidio's landscape vegetation is "rehabilitation." Rehabilitation is the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions of features which convey its historical or cultural values.

Specific planting practices and the day-to-day maintenance plans for the Presidio's many landscape vegetation categories are not part of this plan, but will be addressed in rehabilitation and reuse projects as they are developed and in maintenance plans for specific areas. As specific plans are developed, additional consultation may be necessary to insure compliance with Section 106 of the National Historic Preservation Act.

Maximize Sustainable Practices

The following sustainable practices will guide landscape vegetation management actions. (See Appendix B for a general discussion of Sustainable Practices at the Presidio.)

- Ensure that landscape management projects are consistent with all applicable cultural and natural resource management guidelines and approved plans to minimize impacts. Utilize an interdisciplinary review process to assess the impacts of proposed modifications to Presidio landscapes.
- Minimize the need to rehabilitate landscape vegetation by maximizing the use and promoting the longevity of existing plant materials where they can meet basic program requirements. Use of existing plant material will include salvaging and replanting existing vegetation, propagating Presidio plant stock from historic plant stock, and integrating core cultural landscape features (such as heritage trees) into site plans and designs.
- Minimize impacts of landscape vegetation on adjacent native plant communities and the historic forest by selecting non-invasive plants with respect to the principles and conditions of sustainable landscapes. Ensure that all projects utilize the approved plant lists.

- Minimize the development of landscapes that require intensive ongoing maintenance and energy expenditures. Plants should be selected that are disease- and pest-resistant, water efficient or drought tolerant, adapted to the site's microclimate, and require minimal ongoing maintenance. The natural growth rate and size characteristics of plants should complement the site. Pruning and guying requirements should be minimal.
- Minimize storm water runoff by maximizing groundwater percolation and storm water drainage at each project site. Implement a thorough site grading and drainage plan utilizing appropriate drainage design measures. Promote groundwater percolation through soil decompaction and specification of permeable ground cover materials.
- Minimize the export of waste materials by maximizing the reuse of existing landscape materials (recycled asphalt, concrete, chipped mulch, compost, etc.).
- Minimize use of chemical fertilizers, pesticides, and herbicides by maximizing the use of natural processes that provide these functions such as integrated pest management, composting, and mulching.

Identify, Evaluate, and Map Historic Landscape Plantings

In most cases, additional information is needed to analyze and evaluate the Presidio's landscape vegetation, determine its historic significance, and develop appropriate plant palettes when replacement is necessary. An inventory of historic plants has been initiated (Ron Lutske Assoc. 1997), but additional data compilation and mapping efforts are still to be completed. Landscape vegetation evaluations will conform to the Secretary's Standards typically including:

- An inventory of the plants within the project area;
- Identification and documentation of other valuable information, such as historic design patterns, spatial arrangement of plants, and character-defining historic form and appearance;
- Identification of the species of historic value which have a direct association with the development of the Presidio, were planted prior to 1946, or have commemorative value;
- Identification of the species of botanic value which have unique physical characteristics, are no longer available in commercial nurseries, are difficult to propagate, have natural resource value, or provide an aesthetic value in the landscape; and
- Cross check identified species with the current reference historic plant inventory and map historically and botanically valuable plants.

Retain and Maintain Existing Historic Landscape Species

All valuable historic plant material will be retained. Commercially available plant material of historic species and/or propagated historic or botanical stock will be used where additional planting is needed. Appropriate maintenance measures will be taken to retain the character of the landscape and promote landscape vegetation health, longevity, and appearance (such as weeding, pruning, mowing, mulching, fertilization, irrigation, and pest management).

Specific maintenance plans will be developed for specific planning areas within the Presidio to provide maintenance guidance and procedures. These plans will provide detailed prescriptive treatment recommendations for the protection and long-term maintenance of the landscape resources.

The planning areas established in the GMPA will further be broken down in the landscape preservation maintenance plan into their component landscape parts to include categories such as administrative, residential, viewing, and industrial areas. After general maintenance plans are completed, site-specific maintenance plans will be developed for specific sites and structures. These plans should contain:

- Objectives. Sets out the purpose, scope, and level of detail of the plan and how it will support the existing maintenance program.
- Areas and categories of features. Delineates areas and similar features within a landscape category to help describe the composition of that landscape.
- Inventory of landscape features. Lists all landscape features that are to be managed, including name, origin, age, and size.
- Field inspection and work summary. Provides procedures for conducting field inspections of landscape features and maintenance actions needed.
- Feature data and record keeping. Provides feature-specific information such as historic significance, pest problems and notes relating to individual features concerning changes observed or propagation record.
- Seasonal calendar. Describes cyclic practices and maintenance treatments to insure feature preservation.

Select Appropriate Plants as Replacement Species

When plant replacement is needed within the landscape vegetation zone, historical plant material will be used unless another plant species offers outstanding qualities that better address the goals and objectives of the plan. In such instances, it is important for the new plant material to match the characteristics of historically used plants. To maintain the visual integrity of the landscape which contributes the National Historic Landmark District status, plants with strikingly different characteristics from historic species should not be used on the Presidio.

Examples of situations when plant replacement will be required include:

- Revegetation of landscape sites within developed areas when plant materials are missing and documentation of historical conditions exists,
- Removal of plant material to access or provide new utilities,
- Replacement of historic vegetation that has become overgrown for its location and cannot be pruned to scale; is hazardous because of defects, old age, or disease; or that is damaging historic structures,
- Removal and replacement of invasive species that threaten native or historic plant species, and
- Non-historic building landscape renovation.

Selection for Site Conditions. Landscape plants will be selected that will grow and thrive in the Presidio's site conditions (including fog, wind, and the dry summers of a Mediterranean climate). Other important selection criteria are the sustainability and resource conservation considerations discussed previously, including drought tolerance, disease resistance, and maintenance requirements.

Plants that require intensive maintenance such as frequent pruning and irrigation to keep them in a healthy condition (such as roses, bedding plants, and climbing vines) should be carefully considered before planting. Additional concerns for plant selection in many developed areas include the ability to withstand heavy recreational use and foot traffic.

Plant Replacement Issues and Lists. In some instances, historically used horticultural plants can conflict with other resource management objectives to protect native plant communities. The threat to native plants results from two tendencies of some horticultural plants: the tendency to cross-pollinate and hybridize with native plants (for example manzanita, ceanothus, California poppy, live oak) and the invasive ability of some plants to spread far from the areas where they were planted and crowd out and eventually replace native species (for example iceplant, Algerian and German ivy, cotoneaster).

The GGNRA has developed three lists of approved and prohibited plant material for replacement use to be taken into account in plant selection for vegetation in designed landscapes (see Appendix C for additional information). These working lists will be supplemented, refined, and adjusted over time jointly by the NPS and the Trust as more information is collected and approved sources for plant stock are developed.

- List 1. Plants for Consideration in Designed Landscapes
- List 2. Conditional Use Plants in Designed Landscapes
- List 3. Restricted Use Plants in Designed Landscapes

Lists 1 and 2 contain plants that have been historically used on the Presidio. List 2 contains stipulations to the use of plants to ensure protection of natural resources. Plants on list 3 are prohibited from planting at the Presidio because they are highly invasive or because they have the potential to cross-pollinate with native Presidio plants. Plants that are not found on any of the lists must be evaluated by designated Trust and NPS staff specialists before approval for planting.

Replacing Vegetation of Historic Importance (List 1 or 2). When replacing vegetation that relates to historic buildings and landscapes, historic species will be planted if documentation exists to determine what species were used in the past. When possible, clones of historically significant plants will be propagated to preserve historic genetic material. Exceptions to the selection of a historic species could be made if:

- the species cannot be obtained commercially or through propagation by the park at the time the plant is needed,
- the species cannot be identified,
- the species poses a severe threat to native plant communities, or
- the plant requires high maintenance that makes management impractical.

In these cases, replacement species will be selected from lists of suitable plants (List 1 or 2) that retain the character (similar type, form, texture, and scale) of the original species. When historic considerations are less important (for example, when landscape material is selected to provide screening of non-historic development or to enhance views), horticultural materials will be selected from List 1 or 2 based upon other considerations, including functional, maintenance, and aesthetic requirements, as well as impacts on natural resources.

Plants with High Invasive Potential (Lists 2 and 3). It is important when selecting species for landscaping to avoid the use of plant species that can escape landscaped areas and invade other areas, such as native plant communities, forest understory, or other landscaped areas. Two important factors that can indicate the invasiveness of plant species are their dispersal mechanisms (such as seed dispersal by wind or animals or vegetative spreading by underground stems) and their competitive ability. In order to ensure that landscape plantings do not promote the spread of invasive species, certain plants will be prohibited from being planted anywhere (list 3). If any historically significant plants are on these lists, special approval for their use in landscaping will be required and will include review by the park landscape architect and park plant ecologist.

Some historically important species (such as Algerian ivy and other plants in List 2), while aggressive competitors within native plant communities, can be confined to formal landscaped areas and flowerbeds. These species commonly spread through ground runners or root sprouts and must be contained in restricted areas where they cannot escape to surrounding areas. These species can be used in areas that are isolated from natural areas because they are not likely to disperse into the natural areas from long distances. For historically important plants, the desirability of retaining historic integrity would offset the additional maintenance required to contain them in developed areas where they do not threaten native plant species.

Plants with Cross-Pollination and Hybridization Potential (List 3). Native plant species have evolved within a specific environmental context over thousands of years. Their mere persistence to the present time is an indication of their ability to survive the range of ecological conditions that are present in the specific place where they occur. Since their genes provide the information on how to survive to future generations, it is important that the “gene pool” or sum total of all genetic diversity for a given species is able to exist without being altered by plants from other parts of the world that have not evolved to survive their local conditions.

When closely related species or varieties from other parts of the United States or elsewhere are brought into the environment of a native species, cross-fertilization can occur, which alters the gene pool of the native species. The result can range from small changes in the genetic composition of a plant population, to hybridization where new varieties or subspecies change the genetic material of the affected plant species.

For example, the unique two-toned color of the local California poppy found in the Presidio could be lost if poppies from other parts of the state were to cross-pollinate with the local poppy. Some commonly used horticultural plants that could cross-pollinate or hybridize with native Presidio plants are prohibited from use and are found on list 3. Other prohibited plants on list 3 are native to the San Francisco area, but could cross-pollinate with native plant species now growing on the Presidio.

When dealing with native plant material for landscape purposes, it is essential to only use plant material that has been propagated from confirmed Presidio native plant stock. Since the plant material that can be propagated in the near future from Presidio plant stock is limited and does not always meet the horticultural and historic needs for replacement, other non-native plants have been approved that will be suitable for landscape horticultural use (Lists 1 and 2).

Identify and Maintain Heritage Landmark Trees

Heritage landmark trees include trees that have commemorative value, are outstanding botanical specimens, display unique traits, or serve a particular aesthetic function in the landscape. Many Presidio trees might qualify as heritage landmark trees. Important heritage trees will be identified during an inventory of historic landscape trees, and treatment strategies to enhance their longevity will be developed. Should significant decay or defect require that a heritage landmark tree be

replaced, a seedling from that tree or a clone (if genetic significance is integral to the importance of the tree) will be established.

Identify and Treat Hazardous Trees

Hazardous vegetation includes weakened or defective trees and shrubs, found growing around buildings or along roads, that have the potential to injure people or damage vehicles or buildings if they fall or break.

Landscape trees are distinguished here from historic forest stands when they are growing alone or in small groups or strips near buildings, and along roads, parking and other developed areas. These trees have high aesthetic value and often complement and enhance nearby development. They also present the greatest threat of injury to individuals or damage to property because they are located in high use areas. There are 7,000 to 8,000 trees growing around residences, offices, and warehouse buildings, or along roads of the Presidio. Many of these landscape trees and shrubs are reaching senescence and will require replacement over time.

Hazard Tree Surveys and Treatment. Prior to the turnover of the Presidio to the National Park Service, the Army contracted to alleviate the most hazardous tree situations. In a subsequent survey conducted in 1994 and 1995 that evaluated the condition of trees according to a hazard rating system used by the NPS, nearly two-thirds of the landscape trees were identified as possible hazards that will require continued monitoring and treatment (Britton Tree Services, Inc., Hazard Tree Inventory, 1994-1995 — an appendix to Jones & Stokes Associates, Inc. 1997). The rating system used by the NPS reflects both the probability of tree failure as estimated from tree-defect ratings and the degree of human and property exposure to the hazard.

To reduce potential hazards to an acceptable level of risk, an aggressive tree hazard management plan must be implemented. Surveys and treatment of hazard trees must be conducted continually, with some work required on an annual basis. Trees that are identified as hazards will be given hazard ratings. Trees that have been given high hazard ratings must be treated and inspected annually, and trees with lower ratings must be inspected every 3 to 5 years.

Recommendations for treatment vary depending upon the defect and risk and include tree pruning, thinning and cabling, or removal. Other alternatives include moving amenities such as picnic tables or bus stops away from hazardous trees.

Trees within developed areas that may have historic significance will be preserved as long as possible and practical through treatment, pruning, and other care to extend tree life. When trees must be removed to manage hazardous tree conditions, they will be documented under procedures outlined in the appropriate Landscape Preservation Maintenance Plan before removal.

Site evaluation (as has been discussed in preceding sections) will be conducted prior to tree removal to mitigate some of the impacts of tree removal. (For example, removal activity will consider soil compaction impacts, will generally not be conducted during bird breeding seasons, and will generally not be scheduled to interfere with recreational uses.) Replacement will generally be made with the same species in the same location. If the same species or location is not feasible, an appropriate substitute species and nearby location will be approved by the park landscape architect. Research will document, to the extent possible, historic landscape components that are already missing as a result of past hazardous tree removal.

Regular, systematic pruning of trees by a qualified arborist reduces problems before branches and trunks begin to break, extending tree life. Proactive pruning can reduce potential hazards and

preserve aesthetic and cultural values. There is a significant backlog of work, and funding is required to treat older trees that have been minimally maintained; consequently, hazardous trees must take priority. However, the systematic pruning of all the trees in high-use areas should be a long-term goal in order to preserve these older trees as long as possible and reduce long-term maintenance costs.

Hazardous Tree Replacement. When it is determined that an important landscape tree or a tree of historic significance will be removed within a few years because of hazardous conditions, consideration should be given to establishing a new tree (or trees) in the immediate area so that growth can begin before the old tree is removed. Hazardous tree reports should be reviewed annually by the park landscape architect to determine appropriate areas for new tree establishment. Hazardous trees should be photographed and documented prior to removal and then replaced with a tree of the same species or an approved substitute.

In some cases (for example, along roads through historic forest areas) replanting may not be needed to replace every hazardous tree that is removed. If natural regeneration is likely, replacement may be unnecessary. For example, blue gum eucalyptus will resprout after the parent tree is cut and can be pruned to a single stem for replacement.

3.5 SOIL EROSION AND CONTROL

3.5.1 Description

Much of the Presidio's native soil has been moved or lost as a result of development activities and erosion. Physical disturbance, including excavation and placement of fill during the course of construction activities and vegetation changes such as forest growth, have significantly altered natural soils so they are more erosion prone now than they were before European settlement. Potentially erosive soils cover large areas of the Presidio (Dames & Moore 1996).

Today the primary causes of erosion are development that has altered runoff and foot traffic that has disturbed ground cover, exposed roots, increased compaction, and altered drainage patterns. Off trail hiking, social trails, and designated trails with inadequate drainage are responsible for many erosion sites. Gullies carrying concentrated runoff have developed where foot trails cross or ascend steep slopes or cross soils that are loose and unstable. Water-repelling soil conditions have been generated under Monterey cypress stands in sandy dune soils, resulting in gully or rill erosion. Many of the erosion sites occur on dune sand-Sirdrak series soils with forest vegetation. In some places, severe erosion has had a significant effect on the environment.

A survey of eroded sites at the Presidio has been conducted (Jones & Stokes Associates, Inc. 1997). The survey documented the location of each eroded site; determined the type of erosion; correlated each erosion site with the associated soil, geology, and vegetation type; rated the severity and cause of erosion; mapped the site; and recommended actions for erosion control. The most severe erosion occurs in the following areas:

- The southeastern quarter of the Presidio beginning near the Presidio Boulevard entrance, continuing around Julius Kahn Playground, past Inspiration Point, and into the center of the Presidio northeast of Washington Boulevard.
- Near the Public Health Service Hospital and extending westward to the slopes inland of Baker Beach then northward to the sea cliffs west of Lincoln Boulevard.
- The southwestern corner of the National Cemetery.

3.5.2 Proposed Management Actions

Because many of the Presidio's soils have been disturbed in the past and have high erosion potential, runoff must be carefully managed and controlled. Any Presidio activity that involves surface disturbance or changes in drainage patterns, whether the activity is vegetation management, development, or changes in recreational use, should consider possible erosion effects. Maps of erosive soils should be consulted (Dames & Moore 1996) and mitigation efforts should be developed to reduce ground cover disturbance, soil loss, and soil compaction, and to increase water infiltration.

Recommended actions to address some of the existing erosion sites have been identified and should be undertaken as documented and mapped by Jones & Stokes Associates, Inc. (1997). Corrective actions include redirecting foot traffic, regrading to improve drainage, removing fill, restoring and revegetating sites, stabilizing soils and replanting, maintaining ground cover, constructing retaining walls and boardwalks, repairing gullying, and combinations of these actions. Some of these actions will take place in conjunction with native plant restoration activities or rehabilitation of historic forest areas. All restoration activities should be designed to improve soil and stormwater runoff retention by reducing compaction and increasing water filtration.

A comprehensive trail plan and environmental analysis is needed that designates trails and provides for reconstruction of the Presidio trail system. The amount of current and projected future trail use requires trails that are designed and maintained with proper drainage, and cannot be supported by a system of informal trails. A firm trail base that appears natural but that provides trail stability and durability is needed. Boardwalks, retaining walls, and drainage structures will be required in some areas so that damage to natural features can be repaired and would not reoccur. When trails are realigned, soils will be stabilized and replanted. In some areas, barriers and informational signing will be required to protect natural areas and native plant restoration sites.

3.6 FIRE MANAGEMENT

3.6.1 Existing Policies

The fire management policy of the U.S. Army and the NPS for the Presidio has been one of prevention and suppression of all fires. In recent decades, the U.S. Army maintained the Presidio forest by removing downed material, mowing groundcover, removing hazardous fuel accumulations (such as fallen branches), and removing or pruning hazardous trees. A fire suppression capability was maintained on the base by the Army and is now maintained at the Presidio by the NPS. Mutual aid agreements with local fire departments are also in place if fire fighting needs exceed on-site capabilities. Fire clearances, as recommended by the State of California, continue to be maintained around structures.

Over time, the amount of fuel on the ground has increased, and in some stands where there has been little fuel modification, the threat of fire is increasing. With more visitation to the Presidio, the potential for fire may increase further. The climate of the Presidio is in general not conducive to wildfires starting and spreading because it is cool and humid. However, for several days annually during late summer or fall, easterly winds blow from a warm, dry continental air mass. These winds dry the usually moist forest fuels, resulting in an above-normal fire danger.

The type of vegetation and the topography greatly influence the severity of the fire hazard. Eucalyptus stands, because of their high natural loading of fuels and oil content, can contribute to explosive, major fires, especially if shed leaves, bark, and branches are allowed to accumulate.

3.6.2 Proposed Management Actions

The current practice of suppressing all human-caused fires will continue. Fire prevention practices will continue to focus on fuel reduction and removal near developed areas (along roads and around buildings) where fires are most likely to start. Fuel loads will be frequently inspected and altered when necessary by removing dead and fallen trees and branches, pruning trees to remove dead branches that can act as a fuel ladder, removing excessive forest litter, and in some cases, clearing or mowing understory vegetation in areas that are frequently visited.

Prescription burning has been effectively used as a management tool in other portions of GGNRA in both native vegetation communities and planted and naturalized eucalyptus forests to reduce hazardous fuel, enhance wildlife habitat, increase plant species diversity, prepare restoration sites, and maintain a healthy environment by encouraging natural regeneration. The option to use prescribed burning as a management tool will be considered in appropriate circumstances in the Presidio. Prescription burns are carefully planned and controlled to meet specific weather, fuel moisture, air quality, and vegetation management requirements. Any plans to use prescription burning will be reviewed by the public, as well as cooperating agencies.

3.6.3 Implementation Strategy

A fundamental concept guiding effective implementation of the VMP is that rehabilitation and replacement occur on a gradual and continuous basis. Successful implementation will require thoughtful testing, preparation and planning; an effective communications strategy; stewardship program development; and a monitoring and maintenance program for many years to come. Yearly work programs will be developed to guide long term implementation that factor in public outreach and review as well as an assessment of the success of prior years efforts.

Historic Forest Management Zone and Native Plant Communities Zone

The proposed framework for implementation for the existing historic forest and native plant communities is broken into three phases, as discussed below.

Phase I: Pre-Implementation (2000-2008)

This phase will include the preparatory work prior to full implementation, the results of which will provide valuable and essential information to support the active implementation phase. Work during this period includes:

- Inventory and identify historic stands with canopy openings, and condition assessments to determine “opportunities” for early stand replacements and understory vegetation diversification,
- Characterize soil in both forest stands and natural areas,
- Initiate site-specific pilot projects to test and refine methodologies for forest stand replacement and non-historic forest stand conversion to natural communities, including one project for historically significant stand replacement towards the end of Phase I. Plans for pilot projects should be presented and made available for public input prior to implementation.
- Develop GIS database and monitoring program, seed collection and plant propagation, stewardship program development and education programming, etc.,
- Continue removal of invasive plants in sensitive areas, and

- Develop public education and information-sharing programs.

Phase II: Initiate Implementation (2006-2050)

Based upon an evaluation of work completed under Phase I, a detailed schedule and program for implementation will be developed that will take advantage of “opportunities” presented in the forest’s decline as well as a proactive approach to replacement for certain areas. The on-going environmental remediation program to clean up hazardous materials will also result in site-specific opportunities for revegetation. Major activities will include:

- Continue to monitor and document pilot projects following implementation to provide information to make adjustments to future projects.
- Convert 7 to 10 acres of existing non-historic forest stands to native plant communities and/or diversification of historic forest and understory structure every 2 to 3 years.
- Replace historically significant forest groves.
- Thin, prune and reforest historic forest stands to promote greater forest vigor and health.
- Revegetate disturbed weedy habitat with designated historic forest or native vegetation.
- Maintain activities in regions where successful conversion and replacement has occurred.

Phase III: Second Phase Implementation and Maintenance (2010 until completion)

This phase of work will be based upon the results of the active implementation phase, and will complete the forest rehabilitation and conversion, complete the native plant restoration efforts, and shift the majority of resources into an active maintenance program. Once a stabilized state has been achieved, the maintenance and operational costs should stabilize and ultimately decline. Activities to complete the implementation phase will include:

- Complete planned major forest replanting,
- Complete planned conversion to native plant habitat,
- Final implementation activities,
- Active monitoring program of project results and continued invasive plant removal to ensure the success of work implemented through an active natural areas and forestry stewardship program, and
- Maintenance activities in all zones.

Landscape Vegetation Zone

It is assumed that the designed landscape areas would be rehabilitated and preserved through site-specific planning done in support of other planning and implementation activities (such as leasing) in these developed areas. As an example, the rehabilitation of historic Funston Avenue’s landscape, located at the Main Post, would be accounted for in the site planning for the Main Post area, and then implemented in conjunction with the building rehabilitation program for the Funston Avenue houses.

The current hazardous tree management program, which includes cyclic inspections and treatment as necessary of landmark trees previously identified as potential hazards, will continue. This program is currently a part of the Trust's Facilities department and will be covered under the Presidio's operational budget.

A nursery for propagation of horticultural species, particularly historic Presidio plant species not available commercially, will be established to facilitate rehabilitation of historic landscapes. This could be done in conjunction with the existing native plant nursery and build off of the historic plant inventory currently underway.

Costs and Potential Sources of Funding/Implementation

Implementation of the VMP is a long-term undertaking that will take advantage of opportunities as they arise and be proactive, based upon funding availability. Successful implementation will also rely upon careful management and understanding of the dynamic resource, with respect for natural systems and processes.

With this in mind, implementation efforts will be funded and achieved through a variety of resources. It is expected that work would be done largely by NPS and Trust staff and volunteers, with some specific tasks contracted out. The Presidio Park Stewardship program, including the Presidio Native Plant Nursery, will implement many of the projects for native plant community restoration and forest rehabilitation.

The long-range cost projections for implementation will be adjusted on an annual basis, as well as at the completion of each major phase of work. The program for implementation could be adjusted annually depending upon availability of funds — specific tasks could be increased or decreased for a particular year, and a prioritized work program will be regularly updated to be responsive to changes in funding and ensure a proactive approach to implementation. In particular, the results of the pilot projects under Phase I will render valuable information to more accurately predict the costs for implementation; in addition, a post-construction evaluation at the end of Phase I will allow for adjustments to be made in techniques based upon successes and failures in the pilot projects.

The financial support will most immediately come from annual funds from the NPS and Trust operating budgets, the Jim Harvey Restoration Fund, , grants, and for designed landscapes, from tenants conducting building rehabilitation. The Trust's *Financial Management Program* (July 1998), anticipated capital costs for implementation of the Vegetation Management Plan that are included within the parkwide improvements program for grounds and infrastructure.

4. DESCRIPTION OF PROJECT ALTERNATIVES

Four alternatives and their environmental impacts are analyzed in this Final VMP and EA in conformance with the requirements of the National Environmental Policy Act (NEPA). NEPA requires federal agencies to conduct a careful, complete and analytic study of the impacts of proposals that have the potential to affect the environment, and consider alternatives to that proposal, well before any decisions are made. Federal agencies are also required to involve interested or affected members of the public in the NEPA process. The Final VMP and EA assists the NPS and the Trust in decision making and in the determination that the potential for significant effect does not exist and the preparation of an environmental impact statement is not required. Three alternatives (the three "action" alternatives) are consistent with the approved GMPA, legal requirements, and established standards and guidelines for the management of natural and historic resources in accordance with the mission of the NPS. Following consideration of public and agency comment, Alternative 1 was designated by the NPS and the Trust as the Selected Alternative for VMP implementation.

Alternative 1: The Selected Alternative is composed collectively of the management actions in Section 3, Vegetation Management Plan. It is also the preferred alternative. This alternative is adopted by the NPS and Trust through a Finding of No Significant Impact (FONSI) for the VMP (included as Attachment E).

Alternative 2: No Action continues current management programs.

Alternative 3: Selective Forest Cuts provides an option for more quickly rehabilitating the historic forest.

Alternative 4: Increase Tree Diversity is another historic forest management option that further expands the variety of species that could be considered for replacement of historic species, beyond those considered under Alternative 1.

Actions within the native plant communities and landscape vegetation management zones would be the same in all but the No Action alternative.

A variety of other alternatives were suggested during scoping that would strongly shift the management balance of vegetation resources and the size of the area that they occupy. Alternatives that were considered, but rejected from further evaluation, are also presented with the reasons for their rejection.

4.1 ALTERNATIVE 1: PROPOSED ACTIONS

The proposed actions described in the Vegetation Management Plan are analyzed as Alternative 1. Please refer to Sections 3.2.2, 3.3.2, and 3.4.2. The proposed management actions are summarized below.

Native Plant Communities. Native plant communities would be restored where naturalized forest trees (outside of the historic forest management zone), non-native weedy species, non-historic development, and overgrown vegetation that obscures historic vistas are removed. Thirteen special-status species would be monitored and protected, and their habitat increased and enhanced. Community volunteer efforts would continue and would be expanded to implement additional restoration projects. Invasive weedy species and forest trees would be controlled and restricted to appropriate management zones.

Historic Forest. The historic forest would be rehabilitated within the historic forest management zone as fallen trees and storm events provide openings and opportunities for replacement. Over time, the historic forest management zone would be managed to incrementally increase age and species diversity and to increase conditions that would encourage natural regeneration, with the species that were historically planted continuing to be present. Buffer areas using native trees and shrubs would be considered between native plant communities and historic forest to assist in containment of forest trees within the historic forest management zone. Key historic stands with high visibility would be managed to maintain historic species and configuration. Substitution of historically planted forest species would be considered in a few situations, such as to reduce tree height and to increase pest resistance if needed, following testing of potential replacement trees. Decisions for forest treatment would be made following site-specific evaluation by an interdisciplinary vegetation management team. Historic views and vistas would be maintained. Wood products and debris would be recycled and reused.

Landscape Vegetation. Replacement of horticultural plants within historic landscape areas would be based upon sustainability concerns, the species that were historically used, potential impacts to native species from cross-pollination, and invasive tendencies of some non-native plants. Hazardous trees would be identified, treated, and replaced. Identified erosion problems, as well as drainage and visitor use patterns that could initiate future erosion, would be corrected.

4.2 ALTERNATIVE 2: NO ACTION

Under the No Action alternative, those actions necessary to meet legislative requirements would be carried out. Current management programs would be continued. This alternative would not implement the many of the provisions adopted and approved in the GMPA, and would be restricted to those actions already being conducted. The No Action alternative is the baseline for describing impacts of the proposed actions and other alternatives.

Native Plant Communities. Existing native plant habitat and endangered species would be protected by averting direct threats. Additional habitat enhancement for special-status species would not be undertaken. Ongoing native plant restoration would continue at existing sites, but would not be expanded into new areas. Inventory and monitoring projects would continue at the current level as human resources and funding become available. Trees that have invaded native plant habitat would remain, and natural regeneration and invasion by forest trees would expand into additional areas without containment efforts.

Historic Forest. The historic forest would be preserved and protected, but rehabilitation activities would not be initiated. When storm damage and old age resulted in tree loss, tree debris in more visible areas would be removed and the site would either remain barren or natural regeneration would take place to fill in areas of tree loss. No attempt to manage forest areas, control non-native understory, or encourage diversification or regeneration would be made. Unsightly topped trees along the southeast boundary would not be treated or replaced. Forest trees would continue to obscure scenic vistas.

Landscape Vegetation. Identified hazardous trees in developed areas and near structures would be removed to protect public health and safety and reduce liability. However, proactive pruning to reduce future hazards and prolong tree life would not be conducted. Trees in very visible areas along roadways and near development that die or that are removed because they are hazardous would be replaced by replanting. Other projects to inventory and rehabilitate landscape vegetation and implement sustainability practices would be considered as human resources become available and as

specific or emergency needs arose. Existing erosion problems would continue and would not be corrected unless hazardous conditions developed.

4.3 ALTERNATIVE 3: SELECTIVE FOREST CUTS

Alternative 3 presents an additional treatment option for management of the historic forest management zone. All other actions for the two other vegetation zones (native plant communities and landscape vegetation) and for erosion control are the same as described for Alternative 1.

Historic Forest. Selective blocks of trees of a predetermined size would be removed to allow rehabilitation and replanting of the historic forest. Relatively small block cuts, less than 200 feet in diameter or from one-half to three-quarters of an acre, would be made. The cuts would be distributed throughout the historic forest so that adjacent blocks would have a minimum of a 10-year difference in their treatment dates. The cut block would be planted with the tree species that was historically planted in that area. By keeping the cut blocks relatively small, and staggering the treatment throughout the forest stand, small blocks of even-aged forest would be created, but the forest stand would consist overall of a mosaic of several age classes. The key historic forest stands that are highly visible would be intensively managed to preserve the historic character as in Alternative 1. Scenic vistas and historic views would be maintained as in Alternative 1. Replacement tree species to meet specific needs (such as pest resistance or height modification) would be considered after testing as in Alternative 1.

4.4 ALTERNATIVE 4: INCREASE TREE DIVERSITY

Alternative 4 presents another treatment option for management of the historic forest management zone. All other actions for the two other vegetation zones (native plant communities and landscape vegetation) and for erosion control are the same as described for Alternative 1.

Historic Forest. Rehabilitation of the historic forest would proceed as in the proposed action, except many other tree species would be added for consideration as replacement trees in addition to the three historically planted tree species. This wide diversity of tree species would be considered as replacement species throughout the historic forest management zone. In contrast, Alternative 1 provides for consideration of other trees and shrubs (other than historically planted species) in specific instances — for buffer areas between historic and natural vegetation zones to assist in containment of forest trees, to reduce height of trees in some perimeter areas to allow continuation of neighboring views, and if required to provide pest resistance — but the three historically planted tree species would continue to characterize the forest composition..

While the three primary tree species appear to be well suited to the climate, soil, and conditions that exist in the Presidio, they have several inherent disadvantages related to potential pests and longevity. As described in previous sections, both Monterey pine and Monterey cypress are relatively short lived. Blue gum eucalyptus has undesirable attributes in old age as it becomes more brittle and drops branches, and can add to volatility during wildfires. Eucalyptus, Monterey pine, and Monterey cypress readily naturalize and expand into areas outside of the historic forest and require containment. Monterey pine and eucalyptus are susceptible to pests that have the potential, although not found as of this writing, to seriously damage existing forests. One species, coast redwood, that was historically planted, but that is not dominant would be considered for additional planting in the more sheltered areas. Many other tree species have been identified that might be suitable to supplement historically planted species. These species are of a variety of forms and heights; some are California natives, while others are from other places in the world. Table 2, Tree Species Potentially Suitable to Supplement Current Forest Species, lists these species.

Some of the trees listed in Table 2 (such as the cypress and eucalyptus species listed) have already been discussed in the proposed action as replacement species that would be considered in order to meet special needs (such as view protection by planting trees of a lower stature). These replacement species are not considered suitable for the key historic forests as identified in the proposed action that are highly visible and that would be intensively managed. Historically planted species would continue to be planted or allowed to regenerate in those key areas in order to maintain the historic character.

Table 2
Tree Species Potentially Suitable to Supplement Current Forest Species

| Native Species* | |
|------------------------------|---|
| California buckeye | <i>Aesculus californica</i> |
| Madrone | <i>Arbutus menziesii</i> |
| Toyon | <i>Heteromeles arbutifolia</i> |
| California wax myrtle | <i>Myrica californica</i> |
| Coast live oak | <i>Quercus agrifolia</i> |
| Arroyo willow | <i>Salix lasiolepis</i> |
| Pacific black willow | <i>Salix lucida</i> ssp. <i>Lasiandra</i> |
| California Bay | <i>Umbellularia californica</i> |
| Bigleaf Maple | <i>Acer macrophyllum</i> |
| Non-native Species | |
| Incense cedar | <i>Calocedrus decurrens</i> |
| Port Orford cedar | <i>Chamaecyparis lawsoniana</i> |
| Pygmy cypress | <i>Cupressus pygmaea</i> |
| Gowen cypress | <i>Cupressus govaneana</i> |
| Sargent cypress | <i>Cupressus sargentii</i> |
| Red-flowering gum | <i>Eucalyptus ficifolia</i> |
| Red-spotted gum | <i>Eucalyptus mannifera maculosa</i> |
| Willow-leafed peppermint gum | <i>Eucalyptus nicholii</i> |
| Silver dollar gum | <i>Eucalyptus polyanthemus</i> |
| Coral gum | <i>Eucalyptus torquata</i> |
| Tanbark oak | <i>Lithocarpus densiflora</i> |
| Catalina ironwood | <i>Lyonothamnus floribundus</i> |
| Coulter pine | <i>Pinus coulteri</i> |
| Shore pine | <i>Pinus contorta</i> |
| Afghan pine | <i>Pinus eldarica</i> |
| Bishop pine | <i>Pinus muricata</i> |
| Torrey pine | <i>Pinus torreyana</i> |
| Knobcone-Monterey pine | <i>Pinus × attenuuradiata</i> |
| Holly leaf cherry | <i>Prunus ilicifolia</i> |
| Canyon oak | <i>Quercus chrysolepis</i> |
| Redwood | <i>Sequoia sempervirens</i> |
| California nutmeg | <i>Torreya californica</i> |

*Note: Obtained by regeneration of existing Presidio stock. Species native to California, but not native locally to the Presidio, are listed under non-native species.

4.5 ALTERNATIVES CONSIDERED BUT REJECTED

Three additional alternatives for management of the historic forest management zone were considered but were eliminated from further evaluation because they do not maintain the historic forest character;

would result in unacceptable resource, visitor use, or visual impacts; or are not compatible with the direction established in the GMPA.

4.5.1 Replace Tree Species in the Historic Forest Management Zone with Native Trees

In this alternative, the four dominant species that were historically planted would be replaced with native trees within the historic forest management zone. Over time blue gum eucalyptus, Monterey pine, Monterey cypress, and blackwood acacia would be eradicated because of the existing and potential problems discussed earlier (disease, pest, and fire potential; invasive spread into native plant communities; short life span; and view-blocking tree height). The historically planted species would be replaced with native trees, primarily coast live oak. Other native trees such as California wax myrtle, madrone, toyon, California buckeye, and willow would augment the oak plantings in suitable habitat areas.

This alternative was rejected from further consideration for several reasons. Replacement of the entire historic forest with native trees, with their smaller stature and distinctly different form and appearance (especially from coniferous Monterey pine and Monterey cypress) would totally alter the species composition, character, and appearance of the forest. This change in historic character would conflict with the direction established by the GMPA, would substantially alter a historical resource that contributes to the significance of the Presidio as a National Historic Landmark, and would require further compliance review and consultation as required by Section 106 of the National Historic Preservation Act. Replacement of historically planted trees with trees native to the Presidio would appear to enhance native plant protection, and would reduce aggressive tree naturalization and invasion of native plant habitat areas by eucalyptus and Monterey pine. However, this alternative would not be a native plant community restoration effort because live oak woodland did not occur in most of the historic forest management zone. Prior to European settlement, most of the areas now occupied by forest did not contain native trees, but were shrubland or grassland areas. In the sandy substrates and dune areas that underlie much of the forest zone, it may be difficult or impossible to establish native trees that are not adapted to that habitat.

4.5.2 Restore Open Space Areas (Outside of Landscape Vegetation Management Zone) with Native Plant Communities

Under this alternative, areas zoned as historic forest would be restored to the appropriate native plant community that was presumed to exist prior to settlement by Europeans. Historic landscape vegetation and planted trees would be maintained in conjunction with historic buildings, but the historic forest would be replaced with native plant communities: primarily dune scrub, coastal terrace prairie, and coastal scrub. This alternative would have the advantage of increasing the habitat area for native plants, and especially endangered species.

This alternative was rejected from additional consideration for several reasons: 1) it is not compatible with the management direction established in the GMPA, 2) it would result in the loss of the historic forest as a significant contributing resource to the Presidio National Historic Landmark District, 3) it would have a significant adverse impact on historic resources and the historic landscape, and 4) it would require further compliance review and consultation to conform with Section 106 of the National Historic Preservation Act.

4.5.3 Rehabilitate the Historic Forest Using Large Block Cuts

This alternative would increase the size of block cuts discussed in Alternative 3 and allow rehabilitation of the entire historic forest management zone with young trees over a 20- to 30-year

period. Blocks of forest would be cut in a random pattern and trees replaced with the same species and at the same spacing and configuration as the original forest. The end result would be blocks of even-aged stands (2 to 5 acres in size), but the ages between adjacent blocks would vary. Tree species that were historically planted would continue to dominate. This method has the advantage of being a faster method of rehabilitating the forest and would allow efficient removal and utilization of timber products. Cut blocks would be periodically logged, cleared, and replanted with new trees at the historic spacing configurations with the historically planted species. This treatment would allow "key historic forest stands" as well as other historic forest stands, to be regenerated. It would maintain historic character and appearance by replacing older forests with new even-aged and evenly spaced trees. In areas where height modification is needed, trees would be planted, and then cut and replanted when their height exceeded a predetermined height that would block neighboring views.

This alternative for forest rehabilitation was rejected from further consideration because the scale of the logging operation it requires would greatly alter the setting, solitude, and features of the Presidio and the resulting forest stands would not be sustainable. Recreational activities, aesthetics, scenic values, and natural features would be disrupted. The cutting of live, healthy trees within the historic forest management zone, noise, and the level of activity associated with a logging operation would not be acceptable to most park visitors. Within the cut blocks, another even-aged stand would be created and the current problem of all of the trees maturing and reaching old age at one time would be perpetuated.

4.6 MITIGATION MEASURES FOR ENVIRONMENTAL PROTECTION INCORPORATED INTO THE SELECTED ALTERNATIVE

The table below lists the Mitigation Measures for Environmental Protection incorporated into the Selected Alternative. The measures in the table below replace fully the text listing of mitigation measures in the July VMP and EA (1999) on pages 74 – 75. Some of these new Mitigation Measures were developed by the NPS and the Trust in response to comments and questions raised by the public and agencies during the public review period. These additional measures either clarify VMP implementation procedures or further expand upon the original VMP EA mitigation measures. The added measures strengthen the protection of park resources and the visitor experience during VMP implementation and reinforce the success of VMP projects by expanding on steps required during project planning. In the table below, the measures are grouped by issue area along with a description of the potential environmental effect.

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|---|--------------------|--|--|---|
| Potential impact on the unique character of the historic forest due to the introduction of a more diverse suite of tree and understorey species could jeopardize the NHL Status of the Presidio (Mitigated by CU-1 and CU-2) | CU-1 – A Historic Forest Characterization and Treatment Study (Historic Forest Study) shall be conducted by the National Park Service Olmsted Center for Landscape Preservation, or an affiliated group, to document, analyze and evaluate the characteristic features inherent in the historic forest and to develop a set of treatment recommendations consistent with the Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. This study shall explore whether and to what extent alternate tree species could be introduced into the zones of the historic forest without adversely affecting the unique cultural landscape and character of the historic forest as guided by the National Historic Preservation Act. CU-2 – Future site-specific implementation plans and forestry management practices shall follow the recommendations of the Historic Forest Study to the extent necessary to ensure that the characteristics and qualities that define the Presidio historic forest are protected. | Phase I | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Section 106 Process | Incorporate Historic Forest Study into VMP Implementation Strategy |
| The historic forest, including the key stands, has reached a mature stage and is in decline. Without active forest management, the decline will continue, and potentially impact the singular character of the forest. (Mitigated by CU-3 and CU-4) | CU-3 – The Historic Forest Study shall be prepared in a timely manner to allow for early identification of pilot projects and implementation strategies necessary to rehabilitate the historic forest's key stands. Forestry pilot projects, that both address the management of the historic forest's key stands and test these intensive tree care strategies shall be developed and implemented in a timely manner. CU-4 – All historic forest preservation efforts shall occur under the direction of a qualified urban forester. | Phase I | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Section 106 Process | Incorporate Historic Forest Study Recommendations into Pilot Projects |
| Rehabilitation and replacement of the landscape vegetation could result in a loss in the historic integrity of the cultural landscape (Mitigated by CU-5 and CU-6) | CU-5 – Prior to implementation of rehabilitation projects in the landscape vegetation zone, additional historic research (including site assessments and historic plant inventory), evaluation, and compatibility guidelines shall be prepared for specific sites to ensure compliance with the Secretary's Standards. CU-6 – The need to rehabilitate landscape vegetation shall be reduced by maximizing the use to the extent feasible and promoting the longevity of existing plant materials where they can meet program requirements. Use of existing plant material shall include salvaging and replanting existing vegetation, propagating Presidio plant stock from historic plant stock, and integrating core cultural landscape features (such as heritage trees) into site plans and designs. See also SUS-1. | Phases I, II & III | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Presidio Trust / NPS Grounds Maintenance Program | Require as Part of VMP Implementation Strategy |
| | | Phase II | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Section 106 Process | Incorporate Guidelines into Rehabilitation Projects |
| | | Phases I & II | Presidio Trust / NPS Historic Landscape Architect | Presidio Trust and NPS Leasing Program | Require in Site Planning |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|---|-------------------------------|---|---|---|
| <p>Disturbance and changes to the cultural landscape could affect contributing elements of the Presidio National Historic Landmark District. (Avoided by CU-7 and CU-8)</p> | <p>CU-7 – In accordance with the governing Programmatic Agreement under Section 106 of the NHPA, the following conditions shall apply to the implementation of the VMP.</p> <p>a. All actions and projects that involve ground disturbance and changes to the cultural landscape implemented under the VMP shall be certified by historic preservation personnel through the applicable PA for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties according to the requirements of the applicable PA for that action or project.</p> <p>b. Action and projects that involve ground disturbance shall be subject to the provisions of the PA addressing archeological monitoring and the process followed if unexpected archeological resources are uncovered.</p> <p>c. Consistent with the findings of the Historic Forest Study (see CR-1), any substitute species considered for planting in the historic forest (for example, other species of cypress or eucalyptus of lower stature) or in historic landscape areas shall be tested through pilot projects to assess the ability to survive site conditions and evaluated as to its physical appearance and characteristics.</p> | <p>Phases I, II & III</p> | <p>Presidio Trust VMP Project Manager / NPS VMP Program Manager</p> | <p>Section 106 Process</p> | <p>Require as Part of VMP Implementation Strategy</p> |
| <p>Conformance of Environmental Remediation Program with VMP treatments (Mitigated by ER-1)</p> | <p>CU-8 – Hazardous trees within the historic forest shall be documented under procedures outlined in the appropriate Landscape Preservation Maintenance Plan before removal. Sound forestry criteria for pruning all trees will be developed concurrently with planning for hazardous tree abatement.</p> <p>ER-1 – Vegetation treatments that occur in conjunction with the Environmental Remediation Program for the Presidio shall conform to the VMP zoning map (Figure 3), and shall be subject to site-specific planning and environmental review prior to implementation.</p> | <p>Phases I, II & III</p> | <p>Presidio Trust Forester</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Require as Part of VMP Implementation Strategy</p> |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|--|-------------------------------|--|---|---|
| <p>Potential erosion due to surface disturbance and change to existing ground cover (Mitigated by SO-1)</p> | <p>SO-1 – Projects that disturb soil and groundcover vegetation shall minimize soil erosion by complying with the following best management practices (BMPs):</p> <ul style="list-style-type: none"> • Stumps shall be left and cut at ground level in erosive soils, and erosion control measures shall be taken to reduce compaction, reduce the size of area disturbed, and stabilize soils with approved erosion control techniques including blankets, netting, wattles and straw when needed. • Unless there are no feasible alternatives, the use of heavy equipment shall be avoided in areas where soils are wet and in areas where compaction could occur that would cause significant soil damage. • Disturbed soils shall be returned to a stable condition by ensuring installation of appropriate erosion control measures and by replanting in the native plant community and historic forest areas consistent with the VMP zones. • Site grading and drainage plans shall include drainage design measures that promote groundwater percolation through soil decompaction and use of permeable ground cover. | <p>Phases I, II & III</p> | <p>Presidio Trust VMP Project Manager / NPS VMP Program Manager</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate BMPs into Implementation Plans</p> |
| <p>The mature forest is in decline and needs active management to enhance forest health (Mitigated by FM-1 and FM-2)</p> | <p>FM-1 – The effectiveness of the forest rehabilitation efforts shall be monitored annually, and evaluated every 5 years to consider: changes in the number and size of windthrow areas; progress in moving toward more uneven-aged stands; experience gained from active management of the Presidio forest as well as experiences of other land managers of similar forests; and past and estimated future costs of forest maintenance. The findings shall be used to determine whether changes to forestry strategies, treatments and management will be required.</p> <p>FM-2 – Monitoring of historic forest conditions shall be undertaken to collect data such as soil types, site conditions and seed release and dispersal factors, in order to increase the potential for voluntary reseedling of tree species. See also CR-1 – CR-4.</p> | <p>Phases II & III</p> | <p>Presidio Trust VMP Project Manager / NPS VMP Program Manager</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate Findings into Annual Forestry Workplan</p> |
| <p>Potential impacts on forest health due to infection from pests and diseases (Mitigated by FM-3)</p> | <p>FM-3 – Periodic monitoring and seasonal inspection of selected forest stands shall be conducted to detect disease and pest problems at an early stage. An integrated pest management plan shall be developed if monitoring indicates the presence of the pine pitch canker (a fungus), the eucalyptus longhorn borer, or other known pests and diseases in the Presidio.</p> | <p>Phase II</p> | <p>Presidio Trust Forester</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate Findings into Annual Forestry Workplan</p> |
| | | <p>When Required</p> | <p>Presidio Trust Forester and Presidio Trust / NPS Integrated Pest Management Specialists</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate Monitoring into Annual Forestry Workplan</p> |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|---|---------------|---|--|---|
| Potential impact of increased wild fire hazard as the result of high fire fuel loads (Mitigated by FM-4) | <p>FM-4 – Forest fuel loads shall be frequently inspected, and shall be altered when necessary by removing dead and fallen trees and branches, pruning trees to remove dead branches that can act as a fuel ladder, and removing excessive forest litter. Clearing or mowing of understory vegetation shall occur in areas that are frequently visited when necessary to reduce fire hazard.</p> | All Phases | Presidio Trust Forester and NPS Fire Management Personnel. | Presidio Trust / NPS Grounds Maintenance Program | Incorporate Monitoring into Annual Forestry Workplan |
| Potential impacts of changed viewshed and wind patterns due to VMP projects within historic forest and native plant communities (Mitigated by LU-1 --LU-3) | <p>LU-1 – Public involvement and plan review shall be incorporated into site-specific planning for projects adjacent to residential boundaries. Modifications to projects in response to concerns raised by adjacent communities shall be considered as part of the project planning and design.</p> <p>LU-2 – The size and configuration of forest openings shall depend largely on the effects of storms, but when storm-damaged trees are cleared to prepare a site for rehabilitation, the effect of wind on regeneration success and windbreak functions shall be considered. Clearings will generally be oriented perpendicular to the prevailing wind in a southwest-northeast pattern. See also NO-2, NO-3, PP-1, and VR-1 – VR-5.</p> <p>LU-3 -- Where practicable, conduct an analysis of the potential changes to both the local wind patterns and forest windbreak integrity that could occur as the result of tree removal activities prior to project implementation. Incorporate findings into project design.</p> | Phase II | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Presidio Trust and NPS NEPA Compliance Processes | Incorporate Public Involvement into Project Planning and Design |
| Potential impacts on native plant communities due to the spread of invasive exotic plant species (Mitigated by NP-1) | <p>NP-1 – The following strategies shall be employed to control the spread of invasive exotic plants in the Presidio:</p> <ul style="list-style-type: none"> ▪ A list of approved plant material for horticultural use shall be developed, and periodically revised, in planting plans. ▪ Integrated pest management practices shall be used to control and/or remove targeted invasive exotic species threatening sensitive native habitat. ▪ Tests shall be conducted to evaluate the most ecological and cost effective methods for controlling and/or removing targeted invasive exotic species. | Phase II | Presidio Trust Forester | Presidio Trust / NPS Grounds Maintenance Program | Require as Part of VMP Implementation Strategy |
| | | Phases I & II | Presidio Trust Forester and VMP Project Manager/ NPS VMP Program Manager | Presidio Trust and NPS Compliance Processes | Require as Part of VMP Implementation Strategy |
| | | All Phases | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Strategies into Implementation Plans |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|--|----------------------------|---|---|---|
| <p>Potential impacts on native plant communities, due to VMP-related activities, which could accelerate erosion, change surface hydrology or remove vegetation (Mitigated by NP-2 – NP-6)</p> | <p>NP-2 – Systematic monitoring shall occur to evaluate the success of the native plant community restoration projects. Monitoring results shall be used to document population and species composition changes and provide a baseline for measuring the effectiveness of enhancement and restoration efforts as they are implemented. If negative trends occur, the project would be carefully reviewed and further actions would cease. The project would be revised to determine the necessary corrective action. Annual monitoring activities shall include:</p> <ul style="list-style-type: none"> ▪ Photo documentation of the pre-project condition, restoration activities and annual photo points. ▪ Continuation of regular qualitative evaluation of most existing native plant communities. ▪ Establishment of permanent quantitative transects in reference areas and restored habitat. ▪ Establishment and/or modification of protocols necessary for assessing the development of re-created native plant communities. ▪ Annual censusing and/or range mapping of all thirteen special-status plant species and any other special-status species that may occur in the future. | <p>Phases II & III</p> | <p>Presidio Trust Natural Resources Program Manager and NPS VMP Program Manager</p> | <p>Presidio Park Stewardship Program</p> | <p>Incorporate Monitoring into Implementation Plans</p> |
| | <p>NP-3 – Native plant material shall be salvaged to the greatest extent feasible, as directed by a qualified restoration specialist, prior to tree removal activities within both the native plant communities and historic forest zones.</p> | <p>All Phases</p> | <p>Presidio Trust Natural Resources Program Manager and NPS VMP Program Manager</p> | <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Require as Part of VMP Implementation Strategy</p> |
| | <p>NP-4 – Heavy equipment use shall be scheduled, to the greatest extent feasible, to avoid areas where soils are wet and prone to compaction.</p> | <p>All Phases</p> | <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> | <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate Condition into Implementation Plans</p> |
| | <p>NP-5 – Existing vegetation shall be fenced, if deemed appropriate by a qualified restoration specialist, to prevent accidental incursions during VMP project implementation. An education strategy for work crews shall be conducted on site, to include training in plant and sensitive resource identification.</p> | <p>Phase II</p> | <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> | <p>Presidio Park Stewardship Program</p> | <p>Incorporate Condition into Implementation Plans</p> |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|--|---|--|--------------------------------------|---|
| | <p>NP-6 – All native plants shall be grown from existing Presidio genetic stock propagated at the Presidio-based nursery or in accordance with established practices within the Nursery System Standard Operating Procedures. If no on-site seeds or cuttings are available, documentation of the justification for the reintroduction decision shall be prepared, and an evaluation shall be conducted to determine the most appropriate off-site source for reintroduction. Temporary fencing, to prevent visitors on the trail and overlooks from disturbing existing and newly planted habitat areas after construction, shall be installed where necessary.</p> | Phase II | Presidio Trust Natural Resources Program Manager and NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |
| <p>Potential impacts on native plant communities due to the spread of the historic forest beyond the historical boundaries (Mitigated by NP-7 and NP-8)</p> | <p>NP-7 – Temporary fencing shall be installed to protect native plant communities, as necessary, when removing stands of invasive trees outside of the historic forest, or as needed for forest diversification. Disturbance will be limited to areas prescribed by the fencing.</p> | Phase II | Presidio Trust Natural Resources Program Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |
| <p>Ensure protection of rare and endangered species (Mitigated by NP-9 – 11)</p> | <p>NP-8 – To reduce the workload needed to contain the spread of forest species and increase the diversity of forest species, transition and buffer areas shall be established where historic forest plantings about native plant communities. Buffers shall not be established on the perimeters of key historic forest stands to avoid altering their historic character. Site-specific planting plans for buffer areas shall be guided by both the Historic Forest Study and ecological restoration action plans.</p> | Phase II | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |
| | <p>NP-9 – The southwest corner of the Presidio in Area A is designated as a Special Management Zone (SMZ) for future planning pending the forthcoming U.S. Fish and Wildlife Service (USFWS) Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula. The USFWS Recovery Plan will recommend areas of the Presidio, including the SMZ, that could provide habitat critical for the long-term recovery of the San Francisco lessingia, a federally-listed endangered species. During NEPA review of the VMP, public comment indicated a range of issues for consideration in future planning of the SMZ. These issues include effects on viewshed, wind patterns, noise, native plant restoration, historic forest, rare plant species and wildlife habitat. SMZ planning will proceed when the USFWS Recovery Plan is finalized. At that time, an interdisciplinary group, comprised of resource experts and interested public, will work in a collaborative setting to develop the vegetation zoning and treatment of the SMZ.</p> | Upon Completion of the USFWS Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula | Presidio Trust VMP Project Manager, Natural Resources Program Manager and Forester / NPS VMP Program Manager and Natural Resource Specialist | USFWS Section 7 Consultation Process | Incorporate Critical Habitat into Implementation Plan for SMZ |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|--|---|---|---|---|
| | <p>NP-10 – Monitoring of all known special-status species populations shall be conducted annually until the natural variation in population size is well documented; after that, monitoring shall be conducted at least once every 3 years. If declining trends are observed, then consultation with USFWS to develop corrective management actions shall occur.</p> <p>NP-11 – The Section 7 consultation process shall be followed for all management actions for federally-listed species.</p> | <p>Phases I, II & III</p> | <p>Presidio Trust Natural Resources Program Manager / NPS Natural Resource Specialist</p> | <p>USFWS Section 7 Consultation Process</p> | <p>Incorporate Monitoring and Management Actions into Annual Workplan</p> |
| <p>Potential impact to visitors and residents due to noise generated from power equipment associated with VMP projects (Mitigated by NO-1)</p> | <p>NO-1 – Work areas will be temporarily closed to the public when loud machinery is in operation to avoid exposing visitors to high noise levels. Tasks that generate high noise levels, such as wood chipping, will be conducted at less intrusive areas or moved offsite whenever feasible. Activities that generate high noise levels will be limited to daylight and weekday hours and will be scheduled to minimize noise impacts for visitors and residents.</p> | <p>During Demolition and Construction</p> | <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> | <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate Noise Provisions into Implementation Plans</p> |
| <p>Ensure effectiveness of Pilot Project Programs (Mitigated by PP-1)</p> | <p>PP-1 – Site-specific pilot programs shall be developed and implemented over the next 5-8 years to test and assess the effectiveness of restoration and forestry techniques, and monitor results and performance. Results of the pilot projects shall be used to inform future VMP implementation actions. Pilot projects shall conform to the following:</p> <ul style="list-style-type: none"> ▪ Pilot programs shall be small in scale, varied in location (but generally in less visible areas), and representative of a variety of options for historic forest treatment and native plant community restoration. ▪ Plans for site-specific programs shall be developed through careful site evaluation and biological assessment by an interdisciplinary team. ▪ Site-specific restoration projects shall be subject to NEPA review prior to implementation. ▪ A monitoring analysis, post-construction evaluation and documentation program shall be conducted for each pilot project thereby providing analysis and information to guide the implementation of future projects. | <p>Phase I</p> | <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> | <p>Presidio Trust and NPS NEPA Compliance Processes</p> | <p>Incorporate Conditions into Pilot Projects</p> |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|--|--|---|---|---|
| <p>Potential impacts to volunteer programs and interpretive opportunities as the result of VMP implementation activities (Mitigated by RV-1 – RV-3)</p> | <p>RV-1 – Education, interpretation and public relations programs would be developed and publicized to convey the reasons for the VMP projects.</p> <p>RV-2 – The Presidio Park Stewardship Program and future stewardship programs shall be continued collaboratively between the NPS and Presidio Trust to provide interpretive experiences and volunteer opportunities for the community.</p> <p>RV-3 – The Presidio Trails and Bikeways Master Plan shall conform to guidance of the VMP.</p> | <p>Phase II</p> <p>Phases I, II & III</p> <p>Construction of Presidio Trails and Bikeways Plan</p> <p>Phases I, II & III</p> <p>Phase II</p> | <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> <p>Presidio Trust Natural Resources Program Manager / NPS Natural Resource Specialist</p> <p>NPS VMP Program Manager</p> <p>Presidio Trust Forester</p> <p>Presidio Trust Forester</p> | <p>Presidio Trust / NPS Public Education, Interpretation and Public Relations Programs</p> <p>Presidio Trust Parkwide Improvements Program</p> <p>NPS NEPA Compliance Process</p> <p>Presidio Trust / NPS Grounds Maintenance Program</p> <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Require as Part of VMP Implementation Strategy</p> <p>Require as Part of VMP Implementation Strategy</p> <p>Incorporate into Presidio Trails and Bikeways Plan</p> <p>Incorporate into Annual Forestry Workplan</p> <p>Incorporate Condition into Implementation Plans</p> |
| <p>Potential hazards presented to visitors through tree fall or limb breakage (Mitigated by SA-1)</p> | <p>SA-1 – Hazardous trees that pose direct and unavoidable threats to human health and safety shall be removed following consideration of measures WI 1-3. Hazardous tree reports shall be reviewed annually to determine the need for replacement plantings. The ratio used for replacement plantings shall depend on site-specific conditions such as the level of natural regeneration in the area, effects on visitor experience, and screening requirements.</p> <p>SA-2 – Implementation activities could pose hazards to the public if uncontrolled access is permitted in VMP project areas during implementation. During implementation, the project area, including the portions of any adjacent trail systems and recreational resources, shall be fenced and closed to the public.</p> | | | | |
| <p>Potential for hazards to visitors from VMP implementation activities (Mitigated by SA-2)</p> | | | | | |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|--|---------------|--|---|--|
| <p>Potential interim impacts to visitor experience, due to changed visual effects and landscape features during tree removal and vegetation clearing activities (Mitigated by VS-1 – VS-5)</p> | <p>VS-1 – Reforestation of forestry project areas shall occur as soon after clearing of the dead and down trees as possible (when feasible, within one year). Temporary irrigation shall be installed to ensure the survivorship of saplings.</p> | Phase II | Presidio Trust Forester | Presidio Trust / NPS Grounds Maintenance Program | Incorporate Condition into Implementation Plans |
| | <p>VS-2 – Revegetation of restoration project areas with native plants shall be completed as expeditiously as resources permit. If revegetation takes more than one year, an exotic species control strategy shall be implemented to prevent the establishment of invasive exotic weeds.</p> | Phase II | Presidio Trust Natural Resources Program Manager / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |
| | <p>VS-3 – Forestry rehabilitation areas that require tree removal within the historic forest shall be restricted to a size of less than ½-acre to minimize visual impacts, unless otherwise approved.</p> | Phase II | Presidio Trust Forester | Presidio Trust / NPS Grounds Maintenance Program | Incorporate Condition into Implementation Plans |
| | <p>VS-4 – Photographic simulations shall be developed for a repertoire of typical vegetation management projects to serve as examples of proposed forest rehabilitation and native plant restoration treatments.</p> | Phases I & II | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Simulations into Implementation Plans |
| | <p>VS-5 – The selection of projects for annual workplans shall take into account the cumulative effect of individual projects on the overall scenic resources and visitor experience of the park. Steps shall be taken to disperse the implementation activities throughout the park whenever possible, so as not to overwhelm any one area with dramatic changes. See also SO-1(a), SA-1 and NR-10.</p> | Phase II | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate into Annual Workplan |
| <p>Implementation of the VMP could result in an increased demand for scarce resources and generate increased solid waste (SU-1 – SU-3).</p> | <p>SU-1 – The selection of landscape plants shall consider sustainability criteria including disease and pest resistance, drought tolerance, suitability to the site's microclimate, and the degree of care required to reduce demands for energy and intensive ongoing maintenance.</p> | Phase II | Presidio Trust / NPS Landscape Architects | Presidio Trust and NPS Leasing Program | Require in Site Planning |
| | <p>SU-2 – Water conservation measures shall be factored into the planning, design and on-going maintenance of landscaped areas, including the establishment period for reforestation areas and native plant restoration sites.</p> | Phase II | Presidio Trust / NPS Landscape Architects | Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs | Incorporate Measures into Implementation Plans |
| | <p>SU-3 – Sustainable green waste and composting facilities shall be increased and/or developed to ensure that organic debris is recycled and reused as much as possible within the Presidio.</p> | Ongoing | Presidio Trust Sustainability Coordinator | Presidio Trust Sustainability Program | Incorporate into Presidio Trust Sustainability Program |

Measures for Environmental Protection

| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|---|---|---|---|---|
| <p>Potential impacts to wildlife habitat due to VMP project activities (Mitigated by WI-1 - WI-5)</p> | <p>WI-1 – With the exception of unanticipated events requiring hazardous tree abatement, vegetation removal activities or activities using loud power or mechanical equipment will be scheduled outside of the annual bird-breeding season - currently March 1st to August 15th.</p> <p>WI-2 – To reduce effects on wildlife and wildlife habitat, work areas will be delineated with habitat fencing, where necessary, and work crews shall be trained to minimize effects to habitat values.</p> <p>WI-3 – Any removal of vegetation shall follow adopted guidelines for protection of nesting birds. These guidelines include restrictions on timing of vegetation removal and requirements for searching for nests prior to removal if activities can not be delayed. Unanticipated events requiring hazard tree abatement shall be conducted when necessary outside of the restrictive timelines, and conform to measures SA-1 and SA-2. Restriction of work areas and education of work crews may also be used to reduce possible wildlife impacts.</p> <p>WI-4 – Prior to tree removal, each work site shall be evaluated by a qualified biologist to determine whether any element of the forest or the proposed restoration site provides habitat for any special-status species. Measures shall be developed for avoiding any elements identified. If avoidance is infeasible, consultation would be completed consistent with Measure NP-11. Nonnative forest stands with high wildlife values shall generally be retained, unless they will be replaced incrementally with rare native plant communities, such as serpentine communities, or native plant communities that also have high wildlife value, such as coast live oak or willow riparian plant communities or forest stands with greater wildlife value consistent with the HFCTS treatments.</p> <p>WI-5 – Areas within the forest management zone shall be evaluated to determine where standing dead or downed limbs and trees will be allowed to decompose naturally to enhance wildlife habitat providing they neither harbor pests or diseases that can affect other Presidio resources, nor create a fire hazard, nor conflict with the Historic Forest Study treatments.</p> | <p>Phase II</p> <p>Phase II</p> <p>Phase II</p> <p>Phase II</p> | <p>Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist</p> <p>Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist</p> <p>Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist</p> <p>Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist</p> | <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs</p> <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs</p> <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs</p> <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs</p> | <p>Incorporate Measures into Implementation Plans</p> <p>Incorporate Measures into Implementation Plans</p> <p>Incorporate Measures into Implementation Plans</p> <p>Incorporate Measures into Implementation Plans</p> |

5. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

5.1 PHYSICAL RESOURCES

5.1.1 Affected Environment

Much of the base material for Presidio soils is loose unconsolidated sediments and dune sands that are subject to soil erosion. The soils of the Presidio have undergone major changes since pre-settlement times because of physical disturbance from development, erosion, and compaction. Changes are also the result of forest growth that has increased organic matter, soil fertility, and soil acidity.

The Presidio's three principal drainages have been greatly altered through past construction activities. Riparian areas and surface water can be found along the El Polin drainage, at Lobos Creek, Mountain Lake, Tennessee Hollow, and in the Fort Scott youth center area. All of the water that is used at the Presidio comes from the Lobos Creek drainage and affects that natural system. Because available water is insufficient to provide for both potable water needs and extensive irrigation, water conservation is an important concern.

5.1.2 Impact Assessment

Alternative 1: Selected Alternative

Restoration of stream drainages and riparian areas at Lobos Creek and El Polin Spring/Tennessee Hollow would enhance water resources by restoring natural drainage patterns, improving water quality through reduced sedimentation, and increasing riparian and wetland habitat. Specific action plans for each wetland and creek restoration project would identify any specific impacts on water quality. If needed, Section 402 and 404 permits in compliance with the Clean Water Act would be obtained.

Identified erosion problems would be corrected and soil loss would be reduced with a long-term beneficial impact on soils. Control of foot traffic by construction of a trail system that can accommodate visitor use patterns would minimize the potential for future erosion problems and allow repair of existing problems.

Plant restoration efforts and rehabilitation of historic forest would require soil disturbance as invasive plants and trees are removed. Soil erosion would increase temporarily, but would be minimized by mitigating measures to minimize compaction and control erosion.

Where forested areas are restored to native plant vegetation, soils would be treated to restore them to more natural conditions. The removal of layers of forest litter would reduce hydrophobic conditions that have developed in some forested areas (Jones & Stokes Associates, Inc. 1997). Soils in restoration areas would become less acidic and more capable of rainfall infiltration. Serpentine soils would be returned to a more natural condition by the removal of organic material and forest litter, allowing growth of native species that are adapted to low-nutrient serpentine soils. Erosion in restoration areas would be limited by replanting and soil stabilization whenever soils are disturbed. In native plant communities, native plants grown in the Presidio nursery and salvaged native plants would be used.

To conserve limited water resources, water consumption would be taken into account in selecting plants for replacement and revegetation. The selection of drought-tolerant plants and efforts to minimize irrigation whenever possible would reduce impacts on local water resources.

No significant effect on air quality is expected. Some large equipment use would be required to prepare native plant restoration areas, but use of equipment would be short term. Much of the restoration activity would require concentrated human labor rather than machine use.

Alternative 2: No Action

Initially physical resources would change little. Identified erosion problems and gullying would continue to result in annual soil loss and cause degradation of runoff water quality in natural drainages. The sandy soils of the Presidio are particularly susceptible to erosion, and gullies form easily. Over time, additional erosion problems and more erosion sites would occur as off-trail hiking continued and existing problems were not repaired. Root exposure from unchecked foot traffic and soil erosion would be expected to increase and more forest tree loss would be anticipated. In the future, when tree cover is lost and not replaced, more wind erosion would occur. Wind, a very minor erosion factor today, might become the cause of future erosion problems. As more breaks occur in the western windbreak, blowing sand may have a greater effect on park users and adjacent residential areas.

Soil would continue to be affected and changed from its natural condition by forest trees within the historic forest areas as well as in adjacent areas where trees have invaded and naturalized.

Sustainable maintenance practices and water conservation would not be a primary focus in this alternative. Therefore, water consumption to care for landscape vegetation, using the Presidio's limited water resources, might be at higher levels for this alternative than for the other alternatives that would emphasize use of drought-tolerant plants in landscaping.

Alternative 3: Selective Forest Cuts and Alternative 4: Increase Tree Diversity

Impacts under Alternatives 3 and 4 would be similar to those under Alternative 1. Minor, short-term impacts to soils would occur as small blocks of forest are cleared for rehabilitation within the historic forest management zone. When the small blocks are cut and the tree cover and litter layers are removed, the soil surface would be temporarily disturbed. Some minor soil loss might occur until the areas can be replanted. However, replanting of forest stands would ensure long-term soil stability. The need to use heavy equipment would be higher for these alternatives because they would include proactive clearing of small forest areas, which could increase soil compaction. However, the mitigating measures incorporated in the alternative to reduce equipment compaction would assure that this impact would be insignificant.

5.2 NATIVE PLANT COMMUNITIES

5.2.1 Affected Environment

Currently, native plants dominate approximately 150 acres of the Presidio. The Presidio's native plant communities are described in previous sections (see Section 3.2.1, Description of Native Plant Communities).

5.2.2 Impact Assessment

Alternative 1: Selected Alternative

Native plant communities and associated habitat for special-status plant species would be increased in size, enhanced, and preserved by the proposed actions. Removal of invasive introduced plants and restoration of disturbed area and erosion sites would be beneficial to these plant communities and reduce current threats. Native plant communities would be perpetuated over the long term by policies to remove invasive non-native species when they invade native plant communities, and by more restrictive landscape practices to avoid aggressive species that tend to escape into natural areas.

Native plant communities would be restored on approximately 250 acres of the Presidio. This would bring total acreage proposed for native plant communities to 384 acres (or about 26 percent of the Presidio). In consideration of public comment received, 62 acres in the southwest corner of the Presidio are designated as a Special Management Zone (SMZ) in anticipation of the issuance of a USFWS Recovery Plan that would identify all or part of the SMZ area as important habitat for the long-term recovery of the San Francisco Lessingia. The final vegetation community zoning for the SMZ would be developed through a future planning process following the publication of the final Recovery Plan. There is a range of issues including viewshed, wildlife habitat, etc. that will be considered in planning the SMZ. The size and extent of native plant communities, including dune scrub, coastal prairie, serpentine grassland, serpentine scrub, oak woodland, riparian woodland, foredune, and coastal salt marsh would increase by an amount determined through the planning process. Restoration of native plant communities using species that are adapted to the Presidio's site conditions would have a number of beneficial impacts, including:

- maintaining and potentially increasing species diversity,
- providing more contiguous habitat by increasing the size of the area of plant communities and connecting small islands and fragments,
- ensuring the survival of native plant species, including a number of rare species that might otherwise be lost,
- controlling erosion on bare soils and steep slopes, and
- reducing fire hazard by replacement of trees with native vegetation that has a lower fuel volume.

As the area of native plant communities increases, the spread of weedier non-native annual grasses and herbs would be reduced. Over the long term, it would become easier to manage and maintain the native plant communities, because non-native species would be contained within historic forest and landscape vegetation zones. Changes in microclimate and soil conditions that favor non-native species over native species would be reversed to benefit native plants within restoration areas. The creation of buffer plantings between vegetation of historical value (historic forest and landscape vegetation) and native plant communities would create a transition area to assist in the containment and control of non-native species that could threaten native plant communities. Direct competition from non-native trees would be reduced to the benefit of native species.

Habitat for special-status plant species would be restored and enhanced. By restoring the associated plant communities that naturally occur with endangered species, conditions would be more favorable for variety of native plants, including rare and endangered plants. Specific actions to enhance populations of thirteen special-status species have been developed that would promote their long-term preservation and recovery to the benefit of these species. No negative impacts are anticipated that

would affect any species that is listed as threatened or endangered by U.S. Fish and Wildlife Service, a candidate or proposed for listing as threatened or endangered, listed by the state as rare or endangered, or listed as special-status species by the California Native Plant Society. All actions taken in areas known to provide habitat for special-status species would be protective of these plants. Continued inventory and monitoring would detect any changes, and corrective actions would be taken if needed. The designation of the SMZ will allow the NPS to be responsive to the guidance provided by the USFWS in the forthcoming Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula once it is circulated to the public.

Once established, additional acreage of native plant communities would be more self-sustaining than the more maintenance-intensive landscapes. These communities would continue to require management to keep invasive non-native plants at bay and repair damage that may result from visitor use. They would not require tending, replanting, and maintenance to the extent that is required in landscape vegetation zones. This would increase the sustainability of the Presidio's vegetation.

As resource management activities are conducted there is a potential for work crews or equipment to have an impact on adjacent native vegetation as dead trees, forest slash, and limbs are removed or sites are prepared for native plant restoration. However, mitigating measures to salvage native plants within work sites, carefully train work crews, and limit the size of project areas would mitigate this potential impact.

Alternative 2: No Action

Naturalized forest trees would continue to threaten native plant communities by invading their habitat and directly competing for limited space and resources. Over time, continued deterioration of native plant communities and diminution of natural areas would occur. Invasive non-native species would eventually displace some native plant communities and the loss of some species from the Presidio altogether could result.

Since the introduction of non-native species has fundamentally changed the structure of many natural areas of the Presidio as well as the microclimate and soil, the process of deterioration to native plant communities would not be reversed without aggressive intervention and restoration programs. The Presidio's existing native plant communities that remain are small and are separated from one another by other landscape features. Of the at least 312 native plant species that were historically found on the Presidio, 228 species remain.

It is reasonable to speculate — based on island biogeographical principles — that another quarter of the Presidio's species would be lost if conditions do not change significantly (Vasey 1997). Such a species loss would be a significant adverse impact to native plant communities. Volunteer restoration efforts would continue, and over the short term, changes to habitat would be minimal. Over the long term, however, additional and expanded restoration and endangered species enhancement efforts as outlined in the proposed actions would be needed; otherwise, the diversity of native plant species would likely decline and native plant communities would become even more fragmented.

Special-status species would receive the protection required by law, and long-term inventory and monitoring programs that are underway would continue; however, new habitat enhancement programs would not be undertaken that could provide additional habitat enhancement and recovery potential for these species. Natural regeneration and encroachment into the remaining native vegetation areas by introduced trees, especially eucalyptus and Monterey pine, would continue, eventually jeopardizing many of the remaining natural areas and resulting in the loss of some special-status species.

Alternative 3: Selective Forest Cuts

Impacts on native plant communities would be the same as under Alternative 1 because the proposals in this alternative affect historic forest areas. All native plant restoration and special-status species enhancement actions would be the same for Alternatives 1 and 3, and the beneficial impacts to native plant communities would also be the same.

Alternative 4: Increase Tree Diversity

The impacts of Alternative 4 on native plant communities would be the same as those of Alternative 1 in most respects — beneficial impacts would result from native plant restoration projects and special-status species enhancement.

Because this alternative would introduce consideration of a variety of native and non-native tree species into the historic forest management zone, the effects of any new species on native plant communities would need to be carefully evaluated prior to planting. Trees that could threaten native plant communities by aggressive invasive or cross-pollinating tendencies or trees that could significantly change microclimatic conditions for native species would be avoided to reduce any potential impact.

5.3 WILDLIFE RESOURCES

5.3.1 Affected Environment

Much of the following information is summarized from Jones & Stokes Associates, Inc. (1997). Because of its isolation, the Presidio is characterized by a low diversity of reptiles, amphibians, and mammals. However, in the urbanized environment of San Francisco, the Presidio provides important remnant wildlife habitat for these animals.

Most of the vertebrates that have been recorded are birds (225 species) and the Presidio represents a particularly important habitat area for migrants and non-breeding birds. The Presidio and Golden Gate Park are the only large areas of open space habitat that offer shelter, food, and water for migratory birds on the northern San Francisco peninsula. Bird use of the Presidio is part of the migratory path known as the Pacific Flyway. Many migratory species may only use the Presidios forests or riparian areas for a few days a year, but this habitat is critical to their survival.

Birds breed throughout the Presidio because it is one of the only large areas of native and naturalized habitat on the northern San Francisco Peninsula, and 49 species have been confirmed as nesters. Presidio forests also provide essential habitat for wintering birds and for locally declining species, including California quail, western screech owl, wren tit, and Hutton's vireo, that have been extirpated elsewhere in San Francisco. A total of 29 special-status bird taxa have been observed at the Presidio.

Aquatic animals include the only native fish (the threespine stickleback in Lobos Creek) and introduced species of fish and turtles in Mountain Lake.

Areas of the Presidio have been evaluated for their overall value to wildlife (Jones & Stokes Associates, Inc. 1997). Factors in the evaluation included the species diversity of the wildlife using particular tree species, forest stand size, tree species diversity, connectivity to other forest stands, forest vigor, midstory vegetation, understory cover, proximity to sources of fresh water, and presence of special-status wildlife.

Tree species providing the most valuable habitat based on observed bird diversity are the native coast live oak and willows (oak and willow forests occur at Mountain Lake and along Lobos Creek). Next in value is eucalyptus; several large blocks of high-value habitat occur in the central and southern portions of the Presidio in eucalyptus stands. Flowering eucalyptus and the insects attracted to them draw large numbers of migratory birds. The sturdy branches provide nesting sites for raptors, and cavities offer habitat for cavity-nesting species. Coniferous forests, such as Monterey pine forest, also have moderate wildlife value and are important as roosting sites for larger species, as well as for species such as red-breasted nuthatch, red crossbill, and pine siskin, especially in years when cone production is high.

In terms of habitat characteristics, large blocks of forest habitat with multistoried vegetation and an herbaceous or shrub understory are considered to have the highest value. Stands that are near water or that provide nesting are also considered valuable.

5.3.2 Impact Assessment

Alternative 1: Selected Alternative

Forest stands of high wildlife value, as well as other important habitat areas, would be enhanced by the proposed action. Important native wildlife habitat for diverse bird populations is found in the native vegetation communities along the western and northern edges of the Presidio and in riparian forests near Mountain Lake and along Lobos Creek. Preservation and restoration of these areas would have a beneficial impact on the bird population.

In general, native plant communities to be restored would have higher wildlife value than the introduced forest they would replace. However, some of the forest stands have high to moderate-quality wildlife habitat. For example, considerable removal of existing forest would occur near Inspiration Point. These forest stands have been rated as having high wildlife value. When native scrub and serpentine grassland communities are restored, the number and variety of wildlife using the area should increase.

Serpentine grasslands would provide foraging habitat for a variety of raptors and other birds as well as native mammals, reptiles, and amphibians. Native plant communities would provide an increased winter food source and additional shelter for large flocks of wintering finches, sparrows, and juncos, and nesting sites for ground nesting birds. Together with other elements of the native and non-native plant communities, the area from Inspiration Point to El Polin Spring would be of vital importance as a winter area for common bird populations.

The mosaic of forested and grassland areas that would result in some restoration areas may increase the quality of habitat for some birds such as raptors that often perch in trees and hunt small mammals found in grassland areas.

The value of the historic forest would increase for wildlife habitat with the gradual change of much of the historic forest from monotypic, single-aged stands to more mixed species and multi-aged stands. Large blocks of forest habitat with multi-storied vegetation and an herbaceous or shrub understory received high rankings in the wildlife habitat value analysis (Jones & Stokes Associates, Inc. 1997). More diverse forests would provide a greater variety of habitats and possible nest sites than uniform, even-aged stands.

An understory of native plants would be encouraged in historic forest areas through additional canopy openings and removal of aggressive non-native plants. These native plants would provide additional

food sources for wildlife. Forest rehabilitation and native plant restoration activities would increase the forest/native plant community edge zone, which would also increase habitat diversity.

Restoration of native riparian habitats and restoration of natural creek channels would benefit aquatic animals and invertebrates, as well as riparian bird species, by increasing habitat and riparian plant species used as food sources.

Tree hazard treatment activities would result in a direct loss of bird nesting sites and bat roosts. Trees and forest stands that are used, or have recently been used, for raptor nesting would be excluded from any forest management activity with the exception of hazardous trees that require urgent treatment.

Short-term impacts to wildlife from equipment noise would occur as dead trees and invasive trees outside of historic forest areas are removed. In general, vegetation management activities would not be conducted between February and August 15 if they could be disruptive to breeding birds. Mitigating measures that are included in the plan (such as biological evaluation to determine any site-specific impact to wildlife, seasonal timing of operations, and protection of critical habitat elements) would avoid most adverse wildlife impacts. Mitigating measures have been specifically developed to avoid adverse impacts to any wildlife species that has been designated threatened, endangered, or of special-status.

Some direct losses of small or immobile species, such as small mammals, reptiles, amphibians, and many invertebrates, would probably be unavoidable as forest duff layers are removed for native plant restoration efforts or if heavy equipment is used.

Alternative 2: No Action

Wildlife habitat would remain unchanged initially, but because additional native plant communities might not be restored, no additional benefits to wildlife could be expected or ensured.

Over the long term, both forested and native plant community areas would change. Additional areas of native plant communities that are of high wildlife value could be lost to non-native species, both weedy understory plants and invasive forest species. Depending on which species invaded natural areas, the amount and quality of the wildlife habitat would change. Many native habitats, and especially riparian and woodland habitats, are highly valuable for birds and other wildlife.

If Alternative 2 resulted in a reduction of these native habitats through invasion by non-native species, the habitat quality would be reduced over the long term. On the other hand, if naturalized eucalyptus forest groves increased, they might increase important and high-value wildlife by providing additional nesting and roosting sites.

No attempt would be made to manage habitat to increase structural or species diversity. Factors that reduce the quality of Presidio wildlife habitats would continue, including habitat isolation, fragmentation, and scarcity, and dominance by non-native species. Over time, additional habitat degradation could result.

Alternative 3: Selective Forest Cuts

As in Alternative 1, wildlife habitat would be enhanced by restoration of native plant communities that provide valuable wildlife habitat. The option which distinguishes this alternative of using small cut blocks for historic forest rehabilitation would result in systematic replacement of historic forest areas and in a mosaic of tree groups of different ages. The small block cuts would encourage a more diverse and multistoried forest by increasing light penetration to the forest floor and by encouraging

natural regeneration of both forest trees and native plants in the understory. As a result, this management technique might increase the overall wildlife habitat value of the historic forest, since large areas of forest habitat with multi-storied vegetation and an herbaceous or shrub understory received high rankings for wildlife habitat value.

As this alternative provides for more proactive management and greater degree of forest manipulation and activity than Alternative 1, it would also be more disruptive to wildlife. Migrant wildlife as well as resident populations would be affected by this increased activity. As in Alternative 1, mitigating measures would reduce any direct impacts to nesting birds and special-status species.

Alternative 4: Increase Tree Diversity

Wildlife (especially migrating birds) might benefit by an increased diversity of food and cover from the wider variety of tree species that would be considered in this alternative. Since Monterey pine and Monterey cypress forests have moderate value as wildlife habitat, it is possible that replacement species, especially if planted as mixed stands, would have increased wildlife value. Specific evaluation of selected species and their value to wildlife would be needed to determine the extent of this possible impact.

5.4 HISTORIC FOREST AND CULTURAL RESOURCES

5.4.1 Affected Environment

See Section 3.3.1, Description of Historic Forest.

5.4.2 Impact Assessment

Alternative 1: Selected Alternative

The Presidio forest would be rehabilitated within the historic forest management zone, an area that generally coincides with the extent of the planted forest. Over the long term, the forest would be managed to mimic more natural forest conditions, increasing the degree to which the forest is self-sustaining as well as increasing forest health and longevity. The removal of trees where the forest has expanded into native plant communities beyond the design intent would reduce the extent of the forest, but the historically significant forest areas and the character of the forest would be retained. No adverse impacts on historic features or landscapes would result with incorporation of the guidance and treatment strategies developed in the Historic Forest Study. This Historic Forest Study will use the Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes and will explore whether and to what extent alternative tree species could be introduced into the zones of the historic forest without adversely effecting the unique cultural landscape and character of the historic forest as guided by the National Historic Preservation Act (VMP Staff Report, October 2000). Any subsequent plantings in the historic forest zone (for example, other species of cypress or eucalyptus of lower stature) will be tested through pilot projects to assess its ability to survive site conditions and evaluated as to its physical appearance and characteristics.

The inherent problems of the three dominant species would continue to be management factors. By rehabilitation of small areas of the forest at a time in response to storm damage or natural events, the cycle of even-age maturation can be broken. However, the forest would continue to be dominated by relatively short-lived trees with life spans of 100 to 150 years and tree species diversity would remain low. Removal of exotic understory plants, planting native shrubs and trees along forest transition areas, and encouragement of several age classes in an area would increase structural diversity.

Problems associated with blue gum eucalyptus, including fire volatility, large height, and brittle branches, would continue. However, efforts would be made to minimize these effects by containment of eucalyptus in existing areas and through not planting additional eucalyptus (except in landscape areas or to replace heritage trees).

In a few key visible areas, the historic planting configurations would be maintained through intensive management. Because these key stands have a character-defining appearance, they would require additional maintenance and an intensive management scheme. However, the appearance of the forest would continue to change over time, because the scale and configuration of the current forest cannot be duplicated as new trees replace mature trees. These changes are not viewed as adverse impacts of this alternative, but as changes to a dynamic, and living, historic resource. Clearing to restore historic view sites would enhance the Presidio's historic setting by reestablishing visual linkages and reinforcing original forest design plans.

If pine pitch canker or eucalyptus longhorn borer become serious pests of Presidio trees, the historic forest and the character of this historic resource could undergo a drastic change in appearance in a relatively short time. Conscientious monitoring, sanitary cutting and wood disposal practices would mitigate the potential effect of these pests, but their effects could be widely disruptive to historic forests if an outbreak occurs. In the case of a pest outbreak, impacts to significant historic resources would be reduced by the consideration of replacement species that would maintain the character of the historic forest in conformance with the guidance and treatments provided in the Historic Forest Study.

Wind patterns may change as windfall areas are cleared and rehabilitated and the windscreening effect of mature trees is lost. As forest vegetation is rehabilitated on ridgelines and along the western buffer and mature trees are lost or replaced with young trees, the effectiveness of the trees as windscreens would temporarily be lost. There may be some domino effect as winds then act more forcefully upon other areas of the forest or developed and recreation sites. Prevailing winds in spring and summer from the west and northwest may have a greater effect on the forest and other nearby vegetation until windscreen trees grow and again become effective.

To mitigate effects of wind on the remainder of the forest, important windbreak areas west of Lincoln Boulevard and along ridgetops would be replanted promptly. When possible, tree clearings of storm-damaged trees or sanitation cuts to control disease would be designed to lie perpendicular to winter storm winds that generally blow from the southwest to reduce wind funneling and excessive forest damage. The current lack of an understory in many forest stands creates a wind tunneling effect. As uneven-aged stands are created with uneven heights and more understory, this wind tunneling effect would be minimized.

The removal of naturalized forests and restoration of native plant communities and riparian corridors could have an impact on undiscovered archeological resources, particularly prehistoric sites. Actions and projects that involve ground disturbance will be subject to the provisions of the agencies' PA's addressing archeological monitoring and process initiated if unexpected archeological resources are uncovered. To reduce the impact on surface and subsurface resources, stumps would generally be cut at the ground surface and left in soils that are not sandy dune soils. Stumps would be removed from dune soils where necessary. Removal activities, as well as other restoration actions, could uncover and disturb previously unknown archeological resources, which would require evaluation.

Removal of hazardous trees could also have an impact on subsurface archeological resources. Restoration of both historic forest and native plant communities in the Wherry housing area would require buildings and pavement to be removed with a potential impact to subsurface archeological sites. If unknown resources are uncovered during tree removal or restoration activities, any potential

impact on archeological resources would be mitigated by immediately stopping work and consulting with appropriate parties as required by law and federal regulations before proceeding.

Alternative 2: No Action

Over the long-term, changes in the aging historic forest would occur. If rehabilitation of the historic forest is not undertaken, the character of the Presidio would dramatically change over time. Over the next 50 years many of the original trees (especially Monterey cypress and Monterey pine) planted by the Army would die.

Without significant forest management, the Presidio forest could decline in extent by 45 percent by 2015 (Jones & Stokes Associates, Inc. 1997). While some natural regeneration would continue, the extent and location of the forest would change in ways that cannot be accurately predicted; the forest would likely expand beyond the areas where it was originally planted. Forested areas would include historic forest and naturalized forest. Eucalyptus would resprout and would continue to occupy areas now forested with eucalyptus, as well as expanding into other areas. Relative to their present abundance, losses of the mixed-species and cypress stands would be the most severe. Historic forest areas now occupied by Monterey cypress and Monterey pine would be reduced in size and the areas they occupy would be colonized by non-native grasses, as well as by young trees that regenerate from seeds and other non-native weedy species.

Forests in the windswept western areas of the Presidio may not regenerate without replanting and maintenance care. If the windbreak is lost, additional wind tunneling would be expected to quickly affect the more inland forest stands. Blowing sand and wind erosion might also increase with tree loss. Historic configuration and species composition of individual forest stands would change. While it is assumed that the three primary species would still be the most common tree species, Monterey cypress would be less common than at present since it is the least likely of the forest species to regenerate naturally. Some areas within the historic forest would remain barren and would not be restored. These changes could be significant impacts on this historic resource which contributes to the National Historic Landmark status of the Presidio.

Alternative 3: Selective Forest Cuts

Small, systematic cut blocks would be the fastest way to rehabilitate the historic forest. Over a 30- to 50-year time frame, all of the existing old growth would be removed and replaced with a mosaic of groups of trees of varying ages. Selective cuts would be a more proactive way to treat the forest than relying on storms, windfall, and death of trees by old age to determine areas for rehabilitation as in Alternative 2. Cuts would provide openings for the light needed for forest seedling survival and growth. Because the most highly visible key historic forests would be maintained with their historic configuration, the historic flavor and military appearance of the forest would be retained. Overall the historic location, species composition, and character of the forest would be maintained, and impact on the forest as a historic resource would be beneficial.

Alternative 4: Increase Tree Diversity

The diversity of planted trees would increase, assuming the variety of trees planted could successfully grow in Presidio site conditions. Additional testing would be required to determine which of the proposed species would actually grow and thrive, considering that a very large variety of species were initially planted at the Presidio, but only a few species actually dominate the forest lands today.

Some of the inherent problems associated with the primary planted species (lack of longevity, breakage, and low stand diversity) would be reduced. If species-specific disease or pests became a

major problem in the future, damage would be reduced by having several species, rather than one, in a forest stand. It would also be less likely that an entire forest stand would become senescent, with many aging trees approaching life span limits at the same time, since trees with a variety of life spans would be included in the forest.

The forest species composition and the character of some historic stands would be substantially altered by using a broader variety of tree species for rehabilitation. A more multi-storied, and species-diverse forest would result. Because the most highly visible key historic forests would be maintained, the historic flavor and military appearance of the forest would be retained. Canopy areas as viewed from a distance would change over time, and the visual dominance of the eucalyptus canopy might be reduced.

5.5 VISUAL RESOURCES

5.5.1 Affected Environment

The Presidio is a major visual resource for the San Francisco Bay Area from a variety of perspectives. From a distance, the distinct forested landscape appears as a natural wooded series of low ridges in marked contrast to surrounding urban landscapes. From within the Presidio, scenic vistas to nearby landmarks such as Golden Gate Bridge, Marin Headlands, Angel Island, Alcatraz, as well as to the ocean and bay greatly enhance opportunities for visitor enjoyment of the park area.

Visitors experience a sense of visual enclosure from within the Presidio's natural areas and especially from within the forests, in strong contrast to the visual experiences of the nearby cityscape outside of the Presidio. Three historic vistas, Inspiration Point, along Washington Boulevard on the western slope of Rob Hill, and on Lincoln Boulevard overlooking Crissy Field, were designated by the U.S. Army when roadways and developed areas were planned. Maintenance of these historic viewpoints is of particular importance.

5.5.2 Impact Assessment

Alternative 1: Selected Alternative

The overall appearance of the historic landscape would gradually change as the age and size of trees change. Over the long term, the visual qualities of the area would be enhanced. As small areas within the forest are rehabilitated, a short-term impact would affect the visual quality of the historic forest as dead or down trees are cleared and replaced. However, continual planting, natural regeneration, and growth would retain the overall appearance of the forest. As native plant restoration efforts replace naturalized forests outside of historic forest boundaries visual qualities would be enhanced. Prairies and shrublands rich with wildflowers would emerge in restored native plant communities.

The impact of management activities on visual resources would vary greatly depending upon the point of perspective.

Regional Perspectives (viewpoints into the Presidio from the Golden Gate Bridge, Marine Headlands, bayside communities, and the north waterfront of San Francisco). Individual stands cannot be differentiated. Forest rehabilitation projects and native plant restoration projects generally would not be noticed. The appearance of a forest canopy on ridges and the green open space would remain.

Highway Views (views into the Presidio from U.S. Highway 101 and Route 1). Rapidly passing highway travelers would not likely notice much change. Maintenance and retention of vegetation screening along these heavily traveled roadsides would obscure views of the waterfront and post facilities from the highway.

Neighborhood Views (perimeter residential neighborhoods). Replacement of topped trees with trees of lower stature would enhance the visual quality of current perimeter views into the Presidio and to distant views of the bay, especially from neighborhoods in the southeast portions of the Presidio near Julius Kahn Playground. Unsightly topped trees would be removed and replaced with lower growing and more attractive vegetation. Near other neighborhoods (at Presidio Gate and along the southwestern perimeter) forest rehabilitation and native plant restoration programs would provide screening vegetation. The treatment for the trees within the Special Management Zone (SMZ) in the southwestern corner of the Presidio will be the subject of a future planning effort.

Presidio Vista Points (public use areas and historic vistas). Naturalized forest stands have encroached on the views from Inspiration Point and Rob Hill over the years. Clearing to maintain these scenic vistas has been initiated and would continue. Treatment of these areas would be highly visible as it is conducted, but would greatly enhance the visual quality of the Presidio and maintain it over the long term. Management of vegetation at scenic viewpoints and in view corridors would increase the number and variety of regional views and increase scenic viewing and photography potential. Maintenance and management of screening vegetation along Lincoln Boulevard and Doyle Drive would enhance internal views and help to reduce highway noise.

Several computer-assisted photo simulations have been developed to illustrate how the appearance of the Presidio might change over time under the plan actions and alternatives. Photo simulations modeling the following visual changes are included in Appendix D so that visual impacts, which are subjective and in the eye of the beholder, can be evaluated by the reader. The photo simulations depict:

- Historic forest rehabilitation to increase structural and species diversity,
- A key historic forest stand as it is rehabilitated, and
- Perimeter forest areas where topped trees are replaced.

Alternative 2: No Action

Opportunities for scenic viewing from viewpoints within the Presidio would become further obstructed if historic vistas are not cleared and maintained. Screening vegetation might be lost in some areas over time through tree aging, and without restoration, the beneficial screening of some undesirable views might be lost.

Because tree topping for private view preservation has been discontinued, trees that were topped in the past would remain, possibly growing laterally and eventually upward again, or dying because of structural weakness and old age.

Alternative 3: Selective Forest Cuts

The degree of site disruption and severity of visual impact of block cutting would be proportional to the size of the cut block. With small blocks of one-half to three-quarters of an acre, impacts on the views inside the Presidio would be minimal. From a distance, the canopy would appear variable, rather than continuous, but small openings would not be visually dominant. Rehabilitation activity would be most visible when it occurred near trails and roadsides. Aesthetics would be temporarily

degraded until the cut areas were restored and replanted. Over the long term, visual resources would be enhanced and similar to those under Alternative 1.

Alternative 4: Increase Tree Diversity

The addition of new tree species to the mix of the historic forest would add visual variety and interest, but would also detract from the simplicity and visual form of the historic forests. Other impacts would be similar to those under Alternative 1.

5.6 VISITORS AND AREA RESIDENTS

5.6.1 Affected Environment

The Presidio contains many of San Francisco's finest recreation and large open space areas. Millions of people visit the Presidio each year for recreational, educational, and business purposes. Visitors come from all over the country and the world, as well as from the city and nearby neighborhoods. As opportunities for use increase and additional educational and recreational programs are developed, this multipurpose area will serve more and more visitors. Neighborhood users visit routinely, to walk, bicycle, jog, walk dogs, and use playgrounds and playing fields. Regional visitors and tourists visit scenic attractions, tour military structures and a museum, and participate in interpretive and educational programs.

5.6.2 Impact Assessment

Alternative 1: Selected Alternative

Education programs that increase direct participation in the restoration of native plant communities and forest rehabilitation would increase the interpretive value of the Presidio for environmental education purposes. Education programs including cultural use of original plants by Native American Indians, cultural uses of resources and the landscape throughout periods of European settlement, and the contributions to and changes in land use throughout the Presidio's history can be demonstrated and interpreted. Management of planted forests so that they can become more self-sustaining would be educational because it requires an experimental approach preceded by evaluative design and followed by monitoring to provide feedback for appropriate management changes.

Continuation of successful volunteer restoration programs would promote public understanding of the importance of native plant restoration, continue the involvement of area residents in management of the Presidio's resources, and provide recreational stewardship activities to diverse urban populations.

Visitors would notice the changes in the appearance of the forest and the natural vegetation communities. For some visitors, these changes would be undesirable and would temporarily reduce their enjoyment of the area as naturalized forests are removed and solitude is disrupted. Photo simulations of changes that might occur in forest appearance are included in Appendix D.

Noise levels would temporarily increase during forest rehabilitation efforts, removal of hazardous trees, and restoration of stream drainages, because heavy equipment would be required. The use of chain saws, loaders, chippers, and other equipment would be required to clear dead or down trees and remove wood products. The VMP proposes to temporarily closed work areas to the public when loud machinery is in operation to avoid exposing visitors to high noise levels. To further reduce the potential for VMP projects to generate high noise levels, tasks, such as wood chipping, would be conducted at less intrusive areas or moved offsite whenever feasible and would be limited to daylight and weekday hours and scheduled to periods of heavier visitor use.

Following revegetation and restoration, natural features would rebound quickly. While it may take many years for some species to fully reestablish within restoration areas, wildflowers and solitude would quickly return. Passive recreational activities such as bird watching and photography would be enhanced as wildlife habitat is improved.

Fire hazard would be managed by proactive prevention and the maintenance of an on-site suppression capability. Fire risk and hazard, which is much lower than in warmer Bay Area communities because of cool summers and ocean influence on the Presidio, would remain unchanged. Forest debris and dead trees that could increase fuel loads would generally be removed so that hazardous conditions would not develop. Hazardous tree identification, tree removal, and treatment would maintain an acceptable level of risk to life and property.

Alternative 2: No Action

Opportunities for visitor use would remain unchanged. Neighboring residents on the southeast perimeter would continue to experience view obstruction because of Presidio forest growth and no effort would be made to convert the Monterey cypress forest to another species of lower stature.

The involvement of the community in restoration efforts would continue at existing levels to complete current projects, but additional opportunities to demonstrate a variety of vegetation management treatments and to use rehabilitation efforts as an interpretive tool for park visitors would be lost.

If forest debris were allowed to build up and dead trees were not removed, an increased potential for fire might develop. However, hazardous trees would continue to be removed and treated, maintaining a low level of risk for visitors.

Alternative 3: Selective Forest Cuts

For some visitors, cut blocks would be unsightly and the cutting of live trees within the historic forest areas would be an unacceptable management practice. Other impacts would be similar to those of Alternative 1.

Alternative 4: Increase Tree Diversity

The use of a variety of species in replanting efforts would reduce the dominance of eucalyptus in forest stands. Depending upon the fuel characteristics of replacement species, fire hazard may be reduced. Other impacts would be similar to Alternative 1.

5.7 CUMULATIVE IMPACTS

5.7.1 Alternative 1, Alternative 3, and Alternative 4

The effects of these alternatives added to the effects of other past, present, and reasonably foreseeable related projects would have a positive cumulative effect. Restoration actions would aid in the perpetuation of individual species and native plant communities within the context of a major urban area where much native plant habitat has already been lost. The importance of the protection of remaining native plant habitat and the restoration of additional native plant communities cannot be underestimated within the regional context of the almost totally developed San Francisco peninsula. The Presidio will play an important role in providing habitat crucial to the long-term survival and recovery of rare plant species – at least one of which occurs nowhere else in the world.

Rehabilitation of the historic forest and landscape vegetation would enhance the Presidio's historic setting and have the cumulative effect of preserving significant historic resources in conjunction with other projects to preserve and enhance historic buildings. The Historic Forest Study will provide the basis for rehabilitating the key forest stands and the historic forest as a whole, while preserving the integrity of the forest as a contributing element to the National Historic Landmark status. Scenic viewing opportunities and visual qualities would be enhanced, increasing the overall visual attractiveness of the Presidio.

5.7.2 Alternative 2

More individual species and native plant communities might be lost through lack of management action. If conditions do not change and forest trees are not managed, both natural and historic resources values would be adversely affected.

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APPENDIX A. DEFINITIONS

Biological diversity — the variety of life and processes that govern life. Biological diversity has four major components: genetic—variation of genes within a species; species—variation of the kinds of plants and animals; community/ecosystem—variation of the ways in which the many species of plants and animals aggregate into interacting groups; and process—variation in the physical, chemical, and biological forces to which genes, species, communities, and ecosystems respond.

Cultural or historic landscape — a geographic area that includes both cultural and natural resources that are associated with a historic event, activity, or person. The Presidio's cultural landscape reflects merging of people and place spanning the period of occupancy by native peoples through settlement of the area by Europeans more than 200 years ago. It includes the buildings, vegetation, land use patterns, circulation, vistas, and other features that reflect cultural values and human use of the land over time. Cultural landscapes are evolving, rather than static, because they include living components (such as vegetation) and are affected by natural processes that constantly change the character of the landscape.

Even-aged stand — a stand of trees with individuals that are approximately the same age.

Hazardous tree — a tree, alive or dead, which due to outwardly visible defects could fall down (in part or in entirety) and strike a person or property within a development zone that has facilities and improvements.

Historic forest — forested areas of the Presidio that were planted by the U.S. Army from the afforestation plan developed by Major W. A. Jones. The earliest aerial photograph, taken in 1935, most accurately depicts the extent and generally defines the boundary of the forest. In terms of this plan, the category "historic forest management zone" in Figure 3 defines the area that will be managed as the historic forest.

Landscape vegetation — plant material, usually ornamental trees, shrubs, grass, and plants, growing around buildings or grounds that has been planted to beautify the site or for a utilitarian purpose such as screening a view.

Monotypic stand — a stand dominated by a single species with little or no species diversity.

Native plant community — a group of plants growing together that is composed primarily of native plants that were most likely found on that particular site prior to European settlement.

Naturalized forest — places where forest trees have naturally reproduced through seeds or sprouts, and have expanded to areas outside of original planted sites. All four of the primary forest species have naturalized to some extent — usually by invading nearby native plant communities or other open areas such as scenic road vistas.

Natural regeneration — reproduction and establishment of plants by natural means (through reseeded or sprouting) without replanting.

Non-native plants — plant species that have been introduced (or have invaded through natural dispersal from a site where they were introduced) and did not occur on a given site prior to European settlement. Even though a plant grows as a native species in a nearby location, if habitat for that species does not occur on the site and if it did not occur there as part of a native plant community, it is considered to be non-native. (For example, coast redwood occurs naturally within the Bay area, but it is considered non-native to the Presidio.)

Plant community — a group of plants growing in an interrelated manner on a particular site. Important attributes of a plant community are its species composition, the spatial arrangement of individuals, and interactions among the members and with their environment.

Rehabilitation (as it relates to historic forest and landscapes) — the act or process of making possible a compatible or contemporary use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical values. In rehabilitation, a cultural landscape's character-defining features and materials are protected and maintained; however, damaged or deteriorated portions may require repair and replacement.

Restoration (as it relates to native plants) — a process of replacing existing vegetation on a site with desired vegetation. Desired vegetation for restoration in this plan consists of native plants that would have been found on the site as part of a native plant community prior to European settlement.

Special-status species — plants and animals with limited numbers or distribution that have special legal and policy protection. They are protected under federal and state Endangered Species Acts or other regulation, or are sufficiently rare to either be candidates for or under consideration for such designation.

Uneven-aged stand — a stand of trees with individuals of many different or mixed ages.

APPENDIX B. SUSTAINABLE PRACTICES AT THE PRESIDIO

Sustainable landscapes reflect principles of conservation and an explicit acknowledgment that natural and cultural resources must be preserved, strengthened, and perpetuated. By stressing the interrelatedness between humans and their environment, it is possible to create a landscape that strikes a balance between human resource consumption and resource conservation. However, achieving sustainable landscapes in an urban environment often presents a challenging task for resource managers.

Humans directly benefit from living proximate to sustainable urban landscapes and natural areas. Improved air quality, recreation, inspiration opportunities, noise abatement, wind reduction, erosion control, watershed protection, wastewater management, and air pollution control are all associated with urban landscapes that are managed according to the conditions of sustainability. When sustainable practices guide the management of urban natural areas, humans gain an appreciation of, and respect for, the interrelationships of all contributing parts to natural systems, including their own cultural context.

Though the rationale for promoting sustainable urban natural areas is straightforward, the implementation of associated resource management objectives is far more challenging. Urban natural areas often experience direct and indirect disturbance from humans, are physically isolated from other similar landscapes, and support plant species that have adapted well to sustained human impacts.

Sustainable landscapes are similarly challenging to achieve on the Presidio, given the complex assemblage of native and non-native plant communities, urban encroachment, recreational impacts, National Historic Landmark designation requirements, and state and federal laws that protect a dozen rare or threatened plant species.

The National Park Service identified many of these issues in the Presidio General Management Plan Amendment (NPS 1994a). The plan states that “The Presidio will be a model of sustainability with use and demonstration of innovative environmental technology applications. The Park Service’s *Guiding Principles of Sustainable Design* (NPS 1993b) will provide the basis for sustainable facility design, operations and management, and energy conservation.” The plan lays out a strong framework for achieving the following objectives that relate to this Vegetation Management Plan.

- Adopt the principles of sustainable design and technology when upgrading the built environment.
- Promote and demonstrate conservation practices, including energy conservation, water conservation, and waste reduction and recycling. Include the criterion of drought-tolerance in selection of plant palettes, minimize irrigation water use, and use reclaimed water wherever possible.
- Ensure that the Presidio utilizes alternative pest control methods and minimizes the use of pesticides and herbicides in accordance with policies of Integrated Pest Management.
- Ensure that the Presidio meets strict environmental standards for pollution abatement.

Because the Presidio has a unique combination of natural, historic, and cultural landscapes, the vegetation has been broken down into component parts to permit flexibility in dealing with the complex issues associated with each type of landscape. The three vegetation categories identified in this plan for the Presidio (native plant communities, historic forests, and landscape vegetation) contribute to a unique patchwork quilt of landscapes. Given the diverse qualities associated with each

Appendix B: Sustainable Practices at the Presidio

vegetation type, a framework of sustainable landscape conditions is needed to guide the management of all Presidio vegetation communities.

For the purposes of this plan, five primary conditions are necessary for sustainable practice on the Presidio:

1. Ensure that all projects result in no net loss of resources, or maintenance of the total natural capital stock at or above the current levels as identified in the objectives established for the Presidio under the Government Performance Review Act. A no-net-loss-of-resources mandate requires that all proposed disturbance to vegetative resources be accompanied by an approved mitigation or remediation plan.
2. Current generations must conduct themselves with respect to the welfare and rights of future generations. Specifically, all Presidio vegetation management projects should be assessed in terms of a multi-generation time frame rather than a short one.
3. Minimize energy consumption and recycle all byproducts whenever feasible and practical. Sustainable landscapes require minimal energy subsidies (e.g., irrigation and fossil fuels) to thrive while maximizing the degree to which byproducts are reused as part of the natural system.
4. Maintain and strengthen the genetic diversity of Presidio native plant species, while simultaneously reducing levels of genetic contamination and other threats to the ecological health of these communities.
5. Promote education and awareness for all park employees, as well as the public, regarding the way in which humans may contribute to achieving sustainable urban landscapes.

To ensure that all historic forest, native plant restoration, and designed landscape projects are sustainable, the following steps should be taken prior to restoration or landscape modification:

- Identify how the proposed vegetation management project conforms to the five conditions of sustainability. If necessary, identify the factors that contribute to making the proposed project unsustainable.
- Assess the nonconforming factors with respect to programmatic objectives of the proposed project. If the factors that contribute to unsustainable practices must be integrated into the proposed project, it may be necessary to perform a weighting or benefit cost analysis of the unsustainable portions of the project with respect to project objectives.
- Develop project alternatives that reflect the various ways in which project objectives may be achieved in accordance with the conditions for sustainability.
- Evaluate project alternatives using a forecasting model that integrates quantitative measures whenever possible.
- Select a preferred alternative that maximizes sustainable practices to the greatest extent feasible and document the decision-making process (conditions 1 through 5, above).
- Develop a maintenance and monitoring plan to ensure that the conditions for sustainability are achieved in the short and long term.
- Create extensive opportunities for park employees and the public to learn about sustainability, gain hands-on experience with sustainable practices, and participate in stewardship activities on the Presidio.

APPENDIX C. PLANT SELECTION LIST

The following plant lists will be supplemented, refined, and adjusted over time as more information is collected and approved sources for plant stock are developed. The lists are available for review in the Office of Resource Management and Planning at GGNRA and the Planning Department at the Presidio Trust.

7.1 LIST 1: PLANTS FOR CONSIDERATION IN DESIGNED LANDSCAPES

These plants can be considered for any designed landscape project. They either have been successfully grown at the Presidio or have demonstrated tolerance to similar soil and weather conditions. Their use is recommended but not required. This list consists of a variety of plants, including trees, shrubs and groundcovers, that:

- were used historically or have similar characteristics (form, size, color, texture, etc.) to plants used historically;
- meet sustainability goals of being low maintenance, long-lived, drought tolerant (once established), are not commonly subject to pests or diseases, and
- do not pose a threat to native plant species or plant communities because of potential cross-pollination, hybridization, or invasive tendencies.

7.2 LIST 2: CONDITIONAL USE PLANTS IN DESIGNED LANDSCAPES

It is important when selecting species for landscaping purposes to avoid the use of plant species that can escape into natural, historic forest or other landscaped areas. Two important factors that can indicate the invasiveness of plant species are their dispersal mechanisms (such as seed dispersal by wind or animals, or vegetative spreading by underground stems or roots) and their competitive ability. Use of these plants is permitted except where historic forests or natural areas are adjacent to the project area. In areas that are adjacent to historic forests or natural areas, permission to use these plants would be contingent upon design review by NPS natural resource staff in conjunction with NPS/Trust landscape architects to ensure protection of adjacent natural and historic resources.

This list includes horticultural species with high invasive potential that spread aggressively by runners, root sprouts, or seed but can be confined to formal landscape areas. These plants should be isolated from all natural areas by enough distance to preclude impact to natural or historic forested areas.

7.3 LIST 3: RESTRICTED USE PLANTS IN DESIGNED LANDSCAPES

To ensure that landscape plantings do not promote the spread of invasive species, certain plants are prohibited from any planting list. However, if any historically significant plants on this list are critical to maintain the historic appearance of the landmark district, their use could be considered after review and approval by both the NPS/Trust landscape architect and park plant ecologist. This list contains:

- Horticultural (commercial nursery) species that are difficult to confine to formal landscape areas and become aggressive competitors with native species or are difficult to eradicate once established in natural areas.

Appendix C: Plant Selection List

- Horticultural species which have the potential to cross-pollinate/hybridize with native plants in natural areas of the Presidio. This potential for hybridizing is a serious threat to native plants in the Presidio where specific genotypes still thrive in these remnant native plant communities.
- Species, that for reason of pest management, inappropriate soil, or climatic conditions, should not be used on the Presidio.
- Commercially available native plants that could potentially impact Presidio native plants or plant communities.

APPENDIX D. PHOTO SIMULATIONS OF VISUAL RESOURCE IMPACTS

Computer enhanced photographic simulations were produced to facilitate assessing the visual impacts associated with the forest treatments in the proposed actions.

Photographs of three existing treatment sites were enhanced to theoretically illustrate Initial, Intermediate, and Established plantings at each site over a period of 20 to 25 years. Treatments and sites selected are as follows:

Forest Rehabilitation Site

- **Regeneration with Age/Species Diversification:** Illustrates the diversification of plant species, ages, height, and density over time for a more sustainable forest community.

Key Historic Stand

- **Regeneration with Uniform Age/Same Species:** Replacement over time of the historic forest through systematic replanting of the same species in small, even-aged blocks.

Southeast Boundary Site

- **Replacement with Lower Growing Species:** Replacing the regularly topped cypress grove over time with a lower growing related species for view preservation.

FOREST REHABILITATION SITE

Regeneration with Age/Species Diversification—Initial Planting





Regeneration with Age/Species Diversification—Existing

Regeneration with Age/Species Diversification—Established Planting





Regeneration with Age/Species Diversification—Intermediate Planting

KEY HISTORIC STAND

Regeneration with Uniform Age/Same Species—Initial Planting





Regeneration with Uniform Age/Same Species—Existing

Regeneration with Uniform Age/Same Species—Established Planting

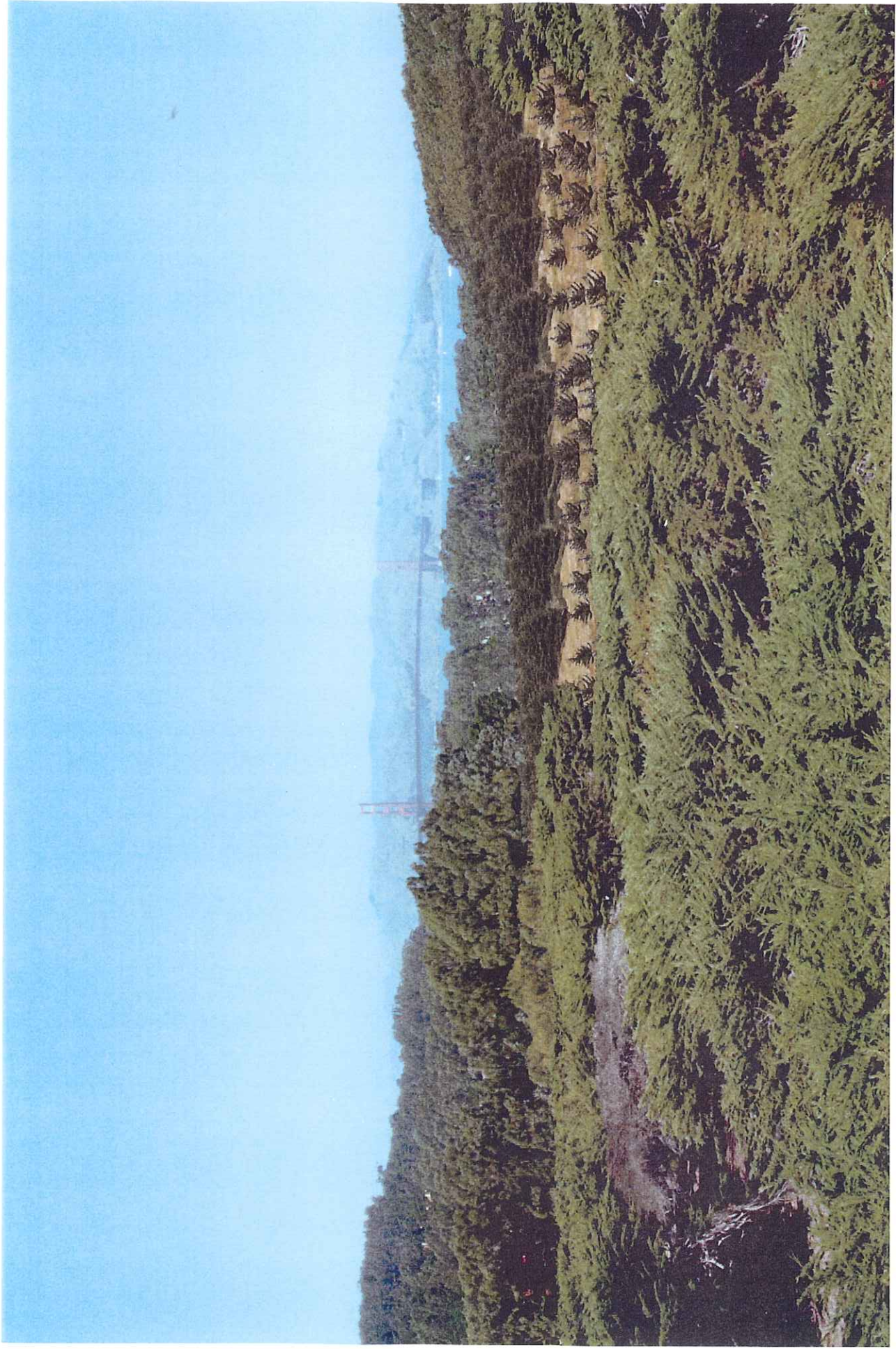




Regeneration with Uniform Age/Same Species—Intermediate Planting

SOUTHEAST BOUNDARY SITE

Replacement with Lower Growing Species—Initial Planting

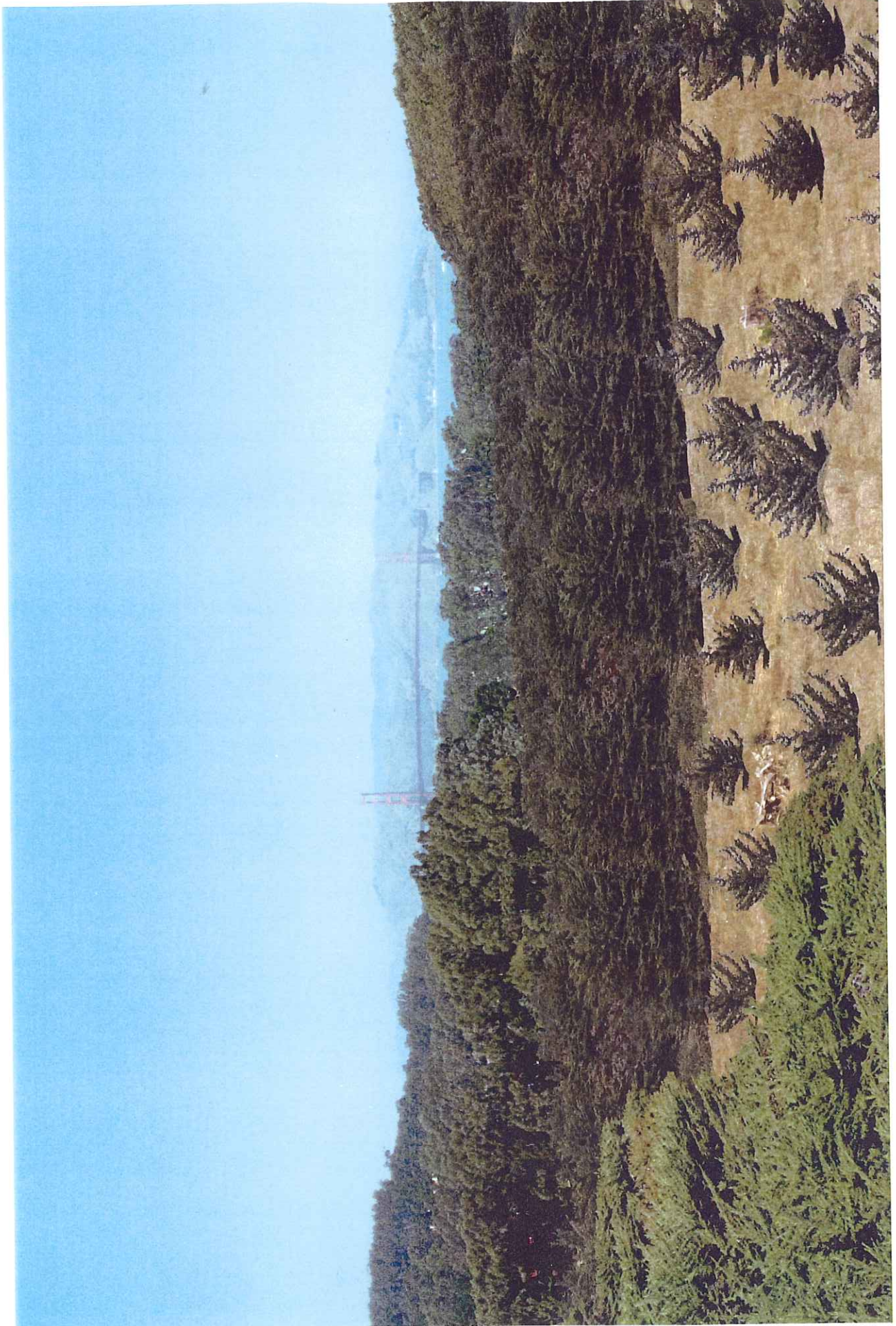




Replacement with Lower Growing Species—Existing

Replacement with Lower Growing Species—Established Planting





Replacement with Lower Growing Species—Intermediate Planting

**APPENDIX E.
VMP FINDING OF NO SIGNIFICANT IMPACT (FONSI)**

PRESIDIO VEGETATION MANAGEMENT PLAN ENVIRONMENTAL ASSESSMENT

FINDING OF NO SIGNIFICANT IMPACT

Prepared by
The National Park Service
and
The Presidio Trust

The Department of the Interior, National Park Service (NPS) and the Presidio Trust (Trust) have prepared this Finding of No Significant Impact (FONSI) on the Presidio Vegetation Management Plan Environmental Assessment (VMP EA) in accordance with the National Environmental Policy Act (NEPA). The NPS and the Trust collaborated in the preparation of the Environmental Assessment (EA), which analyzes the potential impacts of the Vegetation Management Plan (VMP) for the Presidio of San Francisco, part of the Golden Gate National Recreation Area. The NPS and Trust have separate jurisdictional responsibilities in the Presidio. The Trust administers the interior of the Presidio, roughly 80% of the park. The NPS administers the coastal areas.

The NPS initiated the NEPA process and has acted as lead agency in the preparation of the VMP EA (1999). The Trust assumed the role of a cooperating agency under NEPA following the transfer of jurisdiction of Area B of the Presidio from the NPS to the Trust on July 8, 1998. The NPS and the Trust worked closely presenting the VMP to the public, soliciting and considering public comment and designating a Selected Alternative for the VMP. This Finding of No Significant Impact (FONSI) is a decision document signed jointly by the NPS and the Trust that will apply to actions of and satisfy the independent legal responsibilities under NEPA of both agencies throughout the Presidio. Subsequent site-specific implementation plans proposed by the NPS and the Trust will be reviewed for conformance with the VMP and this FONSI.

The purpose of this FONSI is to describe why the Selected Alternative would not have a significant effect on the human environment, and therefore, does not require the preparation of an environmental impact statement. In addition, it affirms the commitment of the NPS and the Trust to the VMP and EA and describes the reasons for choosing the Selected Alternative. The FONSI is based on the analysis of impacts in the "Presidio Vegetation Management Plan Environmental Assessment (VMP EA (1999)) and input received from the public and agencies during the more than 4 months of public review that ended on November 18, 1999.

The FONSI consists of:

- a summary of the background, purpose and need for the plan, plan alternatives and environmental consequences as presented in the VMP EA (1999);
- a description of the public planning process;
- a synopsis of the comments raised by the public and agencies.
- discussions of how the decisions to choose the Selected Alternative and environmentally preferred alternative, were made;
- a description of the modification and clarifications made to the Selected Alternative following consideration of public and agency comment; and
- measures for environmental protection that are incorporated into the Selected Alternative and an implementation program to guide compliance.

A revised and finalized "Final Vegetation Management Plan and Environmental Assessment (Final VMP EA)," dated August 2001 is incorporated herein by reference. It includes text changes, clarifications and additional measures developed after consideration of public and agency comment. A summary of the comments received from the public and agencies and NPS/Trust staff responses to these comments are



August 2001



included as an attachment to the Final VMP EA. The Final VMP EA and this FONSI represent the completed NEPA documentation for the VMP.

STATEMENT OF THE DECISION MADE

The NPS and the Trust will implement the Selected Alternative, as described in the Final VMP EA. The Selected Alternative is a modification of the Proposed Action Alternative in the VMP EA (1999), modified to include additional mitigation measures (see Modifications to the Selected Alternative). This decision allows for the gradual restoration and rehabilitation of the historic forest of the Presidio under the guidance and treatment strategies developed in the Historic Forest Characterization and Treatment Study (Historic Forest Study) using the Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. Modifications also convert the zoning for a portion of the southwest corner of the Presidio to a Special Management Zone to be the subject of a future planning effort.

Framework of the NPS Decision. This alternative was selected by the NPS as it best accomplishes the legislated purposes of GGNRA and the statutory mission of the NPS. The underlying goal of the VMP is the fulfillment of the National Park Service mission, which states:

"The fundamental purpose of all units of the National Park Service is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

To assure fulfillment of NPS' mission, NPS Management Policies (NPS 2000) require decision-makers to consider impacts, and determine in writing, that a proposed action will not lead to an impairment of park resources and values before approving the action. The Management Policies state that impairment prohibited by the Organic Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that would otherwise be present for the enjoyment of those resources or values." The Management Policies further provide specific guidance for NPS managers to use in analyzing whether a proposed action would result in impairment. The Policies states that "...an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park¹;
- Key to the natural or cultural integrity of the park or to the opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant National Park Service planning documents."² (NPS 2000, p.12)

As with many of the management actions considered by NPS decision-makers today, the careful balance of sometimes competing park resources and values is an important component of the review and decision-making process. However, NPS decision-makers are given little leeway when considering impairment of park resources. All elements of an NPS action must avoid impairing park resources. If avoidance is not possible, the elements of the NPS action must be modified or deleted. However, "an impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values" (NPS, 2000, p. 12). The Management Policies provide guidance in this regard by reaffirming that the "fundamental purpose" of the national park system begins with a mandate to conserve park resources and values. Though

¹ GGNRA was established to "...preserve for public use and enjoyment...outstanding natural, historic, scenic, and recreation values, and in order to provide for the maintenance of needed recreational open space necessary to urban environment and planning."(Public Law 92-589)

² Such as the 1994 GMPA and 1996 Crissy Field Plan.



providing for the enjoyment of park resources and values by the people of the United States is also a National Park Service mandate, the NPS is directed by Congress that, in cases where there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is considered predominant (NPS 2000, p. 12).

The VMP provides the NPS with the framework through which the NPS statutory requirements, NEPA commitments and GMPA objectives for managing the vegetation resources of the Presidio can be attained while assuring protection of cultural, natural, scenic and recreational resources. The VMP will guide the actions of the National Park Service within Area A and when collaborating with the Presidio Trust in Area B. NPS actions must be determined to avoid impairment of national park resources or values.

Framework of the Trust Decision. The Selected Alternative is supported by the Trust as it also accomplishes the legislated purposes of the Trust. The Presidio Trust Act (P. L. 104-333, as amended) requires the Trust to manage the Presidio in accordance with the purposes of the Act establishing the GGNRA³ and with the general objectives of the GMPA. The VMP provides the Trust with the framework through which the Trust's statutory requirements, NEPA commitments, and planning objectives for managing the vegetation resources of the Presidio can be attained while assuring protection of the scenic beauty and natural character of the area. The VMP will guide the actions of the Trust within Area B and when collaborating with the NPS in Area A. The objectives, actions, and zoning set forth for the native plant community zone in the VMP would guide the protection, enhancement and restoration activities for vegetation within natural habitats. The objectives and zoning set forth in the historic forest management zone section of the VMP would guide the rehabilitation of the historic planted forest. The VMP would also provide guidance for the management and rehabilitation of other landscaped areas.

Management of the 1,480-acre Presidio was officially transferred from the U.S. Army to the NPS in October 1994, to be managed as part of GGNRA. The NPS now manages 316 acres in the northern and western perimeter of the Presidio, known as "Area A" of the Presidio. The Presidio Trust, a federal corporation established in 1996 by Public Law 104-333, became the land management agency of the interior 1,164 acres of the Presidio, known as "Area B," on July 8, 1998. In anticipation of the transfer from the Army to the NPS, a planning effort to define future use of the Presidio was initiated by the NPS in the early 1990's. After data gathering, analysis and public input, this effort produced the 1994 Final General Management Plan Amendment (GMPA) and Environmental Impact Statement (GMPA EIS) for the Presidio that identified parkwide principles and concepts, and assessed the potential effect of uses and implementation strategies to management and use of this portion of park. The GMPA and GMPA EIS called for a planning effort to manage vegetation resources in the Presidio.

The Presidio Trust is updating the GMPA and supplementing the GMPA EIS for Area B as part of its Presidio Trust Implementation Plan (PTIP) process. The PTIP and PTIP EIS will address Presidio Trust Act requirements, changed circumstances since the GMPA was completed, and new policies and management approaches of the Trust. No approvals for specific projects are being built into the PTIP, but future projects will either conform to the VMP or support a proposal to modify it. The PTIP will incorporate the VMP zoning map unless it specifies otherwise, and future planning to implement the PTIP will document the rationale for adjustments to the VMP zoning map, if proposed. The VMP would also be modified as appropriate if aspects of the plan prove not to be financially feasible. The public will have opportunities for additional review and input as site-specific plans are developed and environmental analysis is conducted.

³ The purposes of the GGNRA Act are stated in its preamble as follows: "In order to preserve for public use and enjoyment certain areas of Marin and San Francisco Counties, California, possessing outstanding natural, historic, scenic, and recreational values, and in order to provide for the maintenance of needed recreational open space necessary to urban environment and planning, the Golden Gate National Recreation Area is hereby established. In the management of the recreation area, the Secretary of the Interior shall utilize the resources in a manner which will provide for recreation and educational opportunities consistent with sound principles of land use planning and management. In carrying out the provisions of this Act, the Secretary shall preserve the recreation area, as far as possible, in its natural setting, and protect it from development and uses which would destroy the scenic beauty and natural character of the area."



Purpose and Need for the Vegetation Management Plan. The scope of the VMP was developed from the park-wide principles in the GMPA (1994a) and further clarified in the mitigation measures for the GMPA EIS (1994b). These principals and mitigations focus on rehabilitation of the historic forest and the cultural landscape; restoration of historic vistas; enhancement and expansion of remnant native plant communities, protection and management of special status plant species, protection of wildlife and their habitats, conservation of water resources, and use of alternative pest management practices (NPS 1994a, pp. 33-41 & 52-54; NPS 1994b, pp. 29-31). The scope of the VMP is broad, to respond to this array of objectives and mitigation requirements.

The GMPA recognized that the historic forest is in an advanced state of maturity and in need of rehabilitation. The boundary of the forest has also shifted over time, expanding into some areas and receding from other areas as the Army developed the Presidio. Neighborhood views are an issue. Trees along the Presidio perimeter have been topped repeatedly over the years to maintain views of the Bay resulting in stands of unsightly, misshapen trees. Historic vistas and views along roadways and other viewpoints have disappeared behind overgrown vegetation requiring restoration and maintenance. Rare plant communities exist as islands in the Presidio and are threatened with displacement by the invasion of other more aggressive, exotic plant species. Soil erosion is a threat to both native plant communities and the historic forest. Within developed areas, historic landscape plantings are overgrown and in many cases disappearing without replacement. Landscaping associated with structures throughout the Presidio is in need of repair and revitalization. Old, weakened trees adjacent to buildings present a hazard and need attention.

To address the numerous challenges in managing the vegetation communities in the Presidio, the GMPA developed principles, set broad goals for agency management and recommended studies and general implementation strategies to achieve those goals. The scope of the VMP was developed to respond to the guidance of the GMPA and foster a comprehensive management strategy for vegetation resources in the new park.

SUMMARY OF THE ALTERNATIVES

The VMP EA (1999) considered three action alternatives (Alternatives 1, 3 and 4) and a No Action Alternative (Alternative 2); the No Action Alternative is a requirement of NEPA. All action alternatives conform to the guidance for vegetation management in the GMPA and implement the GMPA EIS mitigation but with differing management strategies for the Presidio historic forest zone. The principal elements common to all VMP action alternatives include:

- Definition of the baseline extent and the significant characteristics of the most visible cultural landscape feature of the Presidio — the historic forest.
- Establishment of broadly defined vegetation management zones for the Presidio and development goals, objectives, and strategies for each management zone that will foster a coordinated effort in rehabilitating and restoring the native plant, historic forest, and landscaped areas of the Park.
- Development of strategy for rehabilitating the historic forest including varying degrees of integration of native species and natural ecological processes to reduce long-term management and maintenance requirements.
- Development of guidelines and standard practices for project planning, implementation, inventorying and monitoring that will assure the avoidance of adverse impacts to park resources and the visitor experience as the VMP is implemented.
- Development of enhancement recommendations for special status plant populations and communities in all vegetation management zones.



- Preservation of valuable wildlife habitat and enhancement of future wildlife diversity through plan implementation.
- Annual work plans with specific treatments for specific areas to be developed following on-site evaluations and monitoring by resource professionals.

All action alternatives (Alternatives 1, 3 and 4) rely on the zoning map delineating areas of the Presidio where dominant vegetation would be historic forest, landscape vegetation and native plant community. The zoning is derived from the guidance in the GMPA. Guidance addressing cultural resources that was identified in the Final GMPA EIS, is stated in the Presidio Programmatic Agreement between the National Park Service, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation, and is included in the VMP.⁴ The three action alternatives also share the same management strategy for the native plant community zone and the landscape vegetation zone. The action alternatives each present a different implementation strategy for rehabilitating the historic forest zone. A more detailed description of the alternatives is in Chapter 4 of the VMP EA. The summary below outlines the management actions proposed for the three vegetation zones under each of the alternatives.

The Selected Alternative (Alternative 1). Following the assessment of potential effects and careful consideration of public and agency comment, modified Alternative 1 (as described in the Final VMP EA and herein) is designated as the Selected Alternative for the VMP. NPS Guidelines for NEPA compliance (NPSb, 2000) directs the NPS to identify an Environmentally Preferred Alternative – the action alternative that causes the least damage to the biological and physical environment and provides the best protection, preservation and enhancement of historic, cultural, and natural resources. Following the assessment of impacts and consideration of public and agency comment, the NPS designates the Selected Alternative as the environmentally preferred alternative. The following describes treatment strategies for the three vegetation zones under Alternative 1.

Historic Forest Zone. Under the Selected Alternative, the historic forest would be rehabilitated within the historic forest management zone as fallen trees and storm events provide openings and opportunities for replacement. Over time, the historic forest management zone would be managed to incrementally increase age- and species-diversity and to increase conditions that would encourage natural regeneration. Species that were historically planted would continue to dominate. Buffer areas using native trees and shrubs would be considered between native plant communities and historic forest to contain forest trees within the historic forest management zone. Key historic stands with high visibility would be managed to maintain historic species and configuration. Substitution of historically planted forest species would be considered in a few situations, such as to reduce tree height and to increase pest resistance if needed, following testing of potential replacement trees. Decisions for forest treatment would be made following site-specific evaluation by an interdisciplinary vegetation management team. Historic views and vistas would be maintained. Wood from fallen trees and debris would be recycled and reused.

Native Plant Communities. Restoration would bring the total acreage of native plants in the Presidio to 380 acres. Native plant restoration would occur where forest trees have spread outside of the historic forest management zone, or in place of nonnative weedy species, non-historic development, and overgrown vegetation obscuring historic vistas. Twelve special status species would be monitored and protected, and their habitat increased and enhanced. Riparian and wetland habitats would be restored throughout the Presidio including Lobos Creek and El Polin Springs/Tennessee Hollow. Community volunteer efforts would be expanded to implement additional restoration projects. Invasive weedy species and forest trees would be controlled and restricted to appropriate management zones.

Landscape Vegetation. Replacement of horticultural plants within historic landscape areas would be based upon sustainability concerns, the species that were historically planted and potential impacts to

⁴ As part of the upcoming Presidio Trust Implementation Plan, the Presidio Trust will execute a Programmatic Agreement with the National Park Service, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation pursuant to Section 106 of the National Historic Preservation Act. This agreement will provide the methodology for assessing impacts to historic resources and detail requirements of the consultation process for Trust actions implementing the VMP in areas under the Trust jurisdiction.



native species from cross-pollination and invasive tendencies of some nonnative plants. Hazardous trees would be identified, treated, and replaced. Identified erosion problems, as well as drainage and visitor use patterns that could initiate future erosion, would be corrected. Prescriptive management in the landscape vegetation management zone would address existing safety hazards, correct erosion and sedimentation problems and rehabilitate the landscape plantings as directed in the GMPA.

No Action Alternative (Alternative 2). The No Action Alternative, which assesses the effects of continuing present management actions, is a NEPA requirement. It is a viable alternative, and provides an important baseline against which to measure the effects of plan alternatives.

Historic Forest Zone. The historic forest would be preserved and protected, but rehabilitation activities would not be initiated. Unsightly, topped trees along the southeast boundary would not be treated or replaced. Forest trees would continue to obscure scenic vistas. Hazardous trees in developed areas and near structures would be removed, but proactive pruning to reduce future hazards and prolong tree life would not be conducted. Projects to inventory and rehabilitate landscape vegetation, to implement sustainability practices and to correct erosion problems would be considered as human resources become available or as specific or emergency needs arose.

Native Plant Community Zone. The No Action Alternative would continue existing management actions and protections for special status plant species, but would not provide expanded habitat areas for native plants. Current restoration programs, inventorying and monitoring activities would continue.

Landscape Vegetation Zone. Identified hazardous trees in developed areas and near structures would be removed to protect public safety and reduce liability. Proactive pruning to reduce future hazards and prolong tree life would not be conducted. Trees in very visible areas along roadways and near development that die or that are removed because they are hazardous would be replaced by replanting. Inventorying and rehabilitating landscape vegetation and implementing sustainability practices would be considered as human resources become available and as specific or emergency needs arose. Existing erosion problems would continue and would not be corrected unless hazardous conditions developed.

Selective Forest Cuts (Alternative 3).

Historic Forest Zone. Alternative 3 provides an option for more quickly rehabilitating the historic forest by removing selected blocks of trees, in areas ranging from 200 feet in diameter up to 0.75 acres, and replanting with tree species historically found in the forest. The areas of removed trees would be distributed throughout the historic forest so adjacent blocks would have a minimum of a 10-year difference in their treatment dates. The Alternative would create small blocks of even-aged forest, but the forest stand overall would consist of a mosaic of several age classes. The signature stands of historic forest would be intensively managed to preserve their present character. Scenic vistas and historic views would be maintained. Replacement tree species would be used only to meet specific needs (such as pest resistance or height modification).

Native Plant Community Zone and Landscape Vegetation Zone. Same prescriptions as Alternative 1.

Increase Tree Diversity (Alternative 4).

Historic Forest Zone. Alternative 4 would expand the variety of species that could be considered for replacement of historic species beyond those considered under the Selected Alternative. Rehabilitation of the historic forest would proceed as in the Selected Alternative, except many other tree species would be considered as additions to the three historically planted tree species throughout the historic forest management zone. No diversification would be proposed for the key historic tree stands. In contrast, the Selected Alternative would expand the variety of species in the historic forest zone in conformance with the recommendations of the Historic Forest Study prepared under the *Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Replacement tree species would include many native trees found in the Presidio vicinity as well as other non-native trees that would help diversify the canopy and understory by introducing a wider range of eucalyptus species and conifers.



Native Plant Community Zone and Landscape Vegetation Zone. Same prescriptions as Alternative 1.

Alternatives Considered but Rejected. Three additional VMP alternatives are considered but rejected from further consideration in the EA because they did not maintain the historic forest character; would result in unacceptable resource, visitor use, or visual impacts; or are not compatible with the direction established in the GMPA.

Replace tree species in the historic forest zone with native trees.

Restore native plant communities to the historic forest zone.

Rehabilitate the historic forest over a shorter period of time by large block cuts and reforestation.

ENVIRONMENTAL CONSEQUENCES OF THE SELECTED ALTERNATIVE

Mitigation measures incorporated into the Selected Alternative are listed in the table "Adopted Protection Measures". These protective measures are adequate to avoid potential adverse effects to Presidio resources and the neighboring residential communities. Each summary of effect concludes with a NPS finding regarding impairment (see Framework for NPS Decision). This is a policy requirement for the NPS and does not apply to the Trust or the Framework for Trust Decision.

Water. The Selected Alternative would benefit water resources in the Presidio through the restoration of stream drainages and riparian areas at Lobos Creek and Tennessee Hollow. Natural drainage patterns would be restored, water quality improved through the correction of ongoing erosion and increasing riparian and wetland habitat. Site-specific plans for wetland and creek projects will be prepared and assessed for conformance with the VMP and any requirements of the Clean Water Act. A minor increase in soil erosion could occur over the short-term as areas are cleared of invasive plants and trees. Though increasing temporarily, erosion would be minimized through the application of the standard erosion control practices such as revegetation and leaving tree stumps in place. When rehabilitating landscape vegetation, drought tolerance and maintenance requirements will also be considered to promote sustainability and reduce demand on the Presidio water supply. The Selected Alternative would enhance water resources in the Presidio and improve water quality. Some limited soil erosion would occur in the following restoration actions but this short-term impact would not constitute an impairment of park resources or values for the NPS.

Native Plants. Native plant communities and associated wildlife habitat would benefit from the implementation of the VMP through expansion of native plant areas, enhancement through weed removal, soil improvements, erosion correction, and plantings. All ground disturbing activities would be scrutinized to reduce and control expansion of exotic invasive plant species. A buffer strip of native vegetation would be created inside the boundary of the historic forest adjacent to the native plant community zone to help contain the spread of trees species beyond the historic forest boundary. Over time, maintenance of the native plant community zone would decrease as the weed seed bank is depleted and soil composition is normalized. The VMP would enhance existing native plant communities and direct the restoration and monitoring of expanded areas of native plant community – activities that will benefit park resources and not constitute an impairment for the NPS.

Special Status Species. The Selected Alternative will promote the restoration and enhancement of special status species and no negative impacts are anticipated from implementation. The U.S. Fish and Wildlife Service (USFWS) submitted comments on the VMP but did not require consultation. The USFWS requests that consultation occur as site specific implementation actions are developed. All site-specific actions will be reviewed for compliance with the VMP, and where required, additional environmental documents will be prepared. Only beneficial impacts to special status species are anticipated from the VMP and these would not constitute an impairment of special status species for the NPS.

Wildlife. The Selected Alternative would benefit the wildlife population of the Presidio through the preservation and restoration and enhancement of native plant communities and riparian forests providing increased foraging habitat for raptors, other birds, native mammals, reptiles, and amphibians. Restoration



of riparian habitat and natural creek channels would benefit aquatic animals, invertebrates, and riparian bird species by increasing habitat and plant species used as food sources. Native plant communities would provide an increased winter food source and additional shelter for large flocks of wintering birds and nesting sites for ground nesting birds. The value of the historic forest would increase for wildlife habitat with the gradual change of much of the historic forest from monotypic, single-aged stands to more mixed species and mixed-aged stands. An understory of native plants would be encouraged in historic forest areas through additional canopy openings and removal of aggressive nonnative plants and would provide additional food sources for wildlife. Forest rehabilitation and native plant restoration activities would increase the forest/native plant community edge zone, which would also increase habitat diversity. Trees and forest stands that are used, or have recently been used, for raptor nesting would be excluded from any forest management activity with the exception of hazardous trees that require urgent treatment. In general, vegetation management activities that would be disruptive to breeding birds would not be conducted between February and July 15. Measures that are included in the plan (such as biological evaluation to determine any site-specific impact to wildlife, seasonal timing of operations, and protection of critical habitat elements) would avoid adverse wildlife impacts and would not constitute an impairment of park resources for the NPS. Site-specific implementation plans would be reviewed for potential effect in accordance with the VMP.

Cultural Resources. The VMP would have a beneficial effect on Presidio cultural resources through the rehabilitation of the historic forest, preserving historically significant forest stands and retaining the unique character of the forest within the management zone. By rehabilitating the forest in small increments in response to storm damage or natural events, the cycle of even-age maturation can be modified. Removal of exotic understory plants, planting native shrubs and trees along forest transition areas, and encouragement of several age classes in an area would increase structural diversity. Over the long term, the forest would be managed to mimic more natural forest conditions, increasing the degree to which the forest is self-sustaining as well as increasing forest health and longevity. These changes are not adverse impacts of the Selected Alternative, and would not constitute an impairment for the NPS, but rather are changes to a dynamic, and living, historic resource.

If pine pitch canker or eucalyptus longhorn borer become serious pests of Presidio trees, the historic forest and the character of this historic resource could undergo a drastic change in appearance in a relatively short time. Monitoring and sanitary cutting and wood disposal practices will be used to reduce the potential of a pest outbreak. If considerable losses to historic forest trees occur from pest infestation, replacement species that maintain the character of the historic forest would be considered.

Viewshed. Clearing to restore historic view sites would enhance the Presidio's historic setting by reestablishing visual linkages and reinforcing original forest design plans. The overall appearance of the historic landscape would gradually change as the age and size of trees change. As small areas within the forest are rehabilitated, a short-term impact would affect the visual quality of the historic forest as dead or down trees are cleared and replaced. However, continual planting, natural regeneration, and growth would retain the overall appearance of the forest.

From a regional perspective, the appearance of a forest canopy on ridges and the green open space would remain. Rapidly passing highway travelers would not experience a perceptible change in vista. From the perimeter residential neighborhoods, the replacement of topped trees with trees of lower stature would benefit the aesthetics of the current perimeter condition and views of the bay. At the Presidio Gate and along the southwestern perimeter, forest rehabilitation and native plant restoration programs would provide screening vegetation. Historic vistas within the Presidio would be cleared. Treatment of these areas would be highly visible as it is conducted, but would greatly enhance the visual quality of the Presidio, maintain it over the long term and would not constitute an impairment of park resources or values for the NPS.

Visitor Experience. The effect on the visitor experience at the national park would be beneficial by providing increased opportunities for the public to participate in restoration of native plant communities and forest rehabilitation. These programs provide important environmental education and stewardship



components. Education programs including cultural use of original plants by Native American Indians, cultural uses of resources and the landscape throughout periods of European settlement, and the contributions to and changes in land use throughout the Presidio's history can be demonstrated and interpreted. The changes in appearance of the forest and the natural vegetation communities will be undesirable over the short-term to some visitors and inspirational to others. While VMP projects are being implemented, there could be a temporary, localized increase in noise levels that could disturb the quiet experience of park visitors, but these periods of high noise level would be relatively brief as the size of tree removal projects is limited to 0.5 acre in size. Exposure of park visitors to higher noise levels during implementation of VMP projects would be a short-term impact restricted to the vicinity of work area and would not constitute an impairment of park resources or values for the NPS.

Wind. Wind patterns may change as windfall areas are cleared and rehabilitated and the wind-screening effect of mature trees is lost. As forest vegetation is rehabilitated on ridgelines and along the western buffer and mature trees are lost or replaced with young trees, the effectiveness of the trees as windscreens would temporarily be lost. To reduce the effects of wind on the remainder of the forest, important windbreak areas west of Lincoln Boulevard and along ridgetops would be replanted promptly. When possible, tree clearings of storm-damaged trees or sanitation cuts to control disease would be designed to lie perpendicular to winter storm winds that generally blow from the southwest to reduce wind funneling and excessive forest damage. The current lack of an understory in many forest stands creates a wind tunneling effect. As uneven-aged stands are created with uneven heights and more understory, this wind tunneling effect will be minimized. Minor and gradual changes in wind patterns caused by the loss of mature trees would not constitute an impairment of park resources or values for the NPS.

Archaeology. The restoration of native plant communities and riparian corridors could have an impact on undiscovered archeological resources, particularly prehistoric sites. To reduce the impact on surface and subsurface resources, stumps would be cut at the ground surface and left in soils. Ground disturbing activities associated with VMP implementation could have an impact on the subsurface archeological resources. This would be mitigated by immediately stopping work upon discovery of archaeological resources or potential archaeological resources and consulting with appropriate parties as required by federal law and regulation before proceeding. All site specific implementation plans would be reviewed for potential impacts to cultural resources. The VMP mitigation measures would ensure that NPS actions would not impair cultural resources in the Presidio.

Fire. Fire hazard will be managed by proactive fire prevention and the maintenance of an on-site suppression capability. Fire risk and hazard, which is much lower than in warmer Bay Area communities because of cool summers and ocean influence on the Presidio, would remain unchanged. Forest debris and dead trees that could increase fuel loads would generally be removed so that hazardous conditions would not develop. Hazardous tree identification, tree removal, and treatment would maintain an acceptable level of risk to life and property, would not affect the integrity of the historic forest and would not constitute an impairment for the NPS.

SUMMARY OF PUBLIC INVOLVEMENT

The public involvement program for the VMP included notices, workshops, site visits and public meetings. Elements of this public involvement program are summarized in the table below:

| Date | Description of Public Involvement |
|--------------------------------|---|
| September, 1997 | Newsletter mailed to 1,400 nearby homeowners, neighborhood organizations, Presidio tenants, and agencies asking for input on vegetation management and announcing public workshops. |
| September 30 & October 1, 1997 | NPS public workshops on issues and guidelines for vegetation management. |
| December, 1997 | Summary of scoping comments sent to an expanded mailing list. Over 100 individuals and organizations provided input on issues addressed during the scoping phase. |
| September, 1998 | Preliminary VMP EA presented to GGNRA Advisory Commission at a public meeting. |
| June 9, 1999 | Presidio Trust held a public workshop on VMP EA issues. Summaries of the plan were |



| Date | Description of Public Involvement |
|---|--|
| | sent out to 2000 individuals and organizations. |
| July 1, 1999 | VMP EA released to the public. Formal public comment period initiated. |
| July 20, 1999 | VMP EA presented at a joint meeting of the GGNRA Advisory Commission and the Presidio Trust. |
| July 10, August 5, October 30, 1999 | NPS and Trust staff conduct public field trips to discuss plan proposals on site. |
| July 20, August 17, Sept. 21, Oct. 19, 1999 | Oral comments received from the public at GGNRA Advisory Commission meetings. |
| October 28, 1999 | Presidio Trust in cooperation with NPS gathered an interdisciplinary group of academic, government, and other specialists to solicit technical comments on the VMP EA. |
| November 17, 1999 | NPS and Presidio Trust staff present the VMP EA to the Presidio Trust Board of Director's meeting and oral comments were received from the public. |
| November 18, 1999 | The formal comment period closed. |
| October 17, 2000 | NPS and Presidio Trust staff present a summary of public and agency comments and staff responses at the GGNRA Advisory Commission meeting. |

Comments Received. The following is a breakdown of oral and written comments received during workshops prior to the public comment period and during the public comment period from July 1, 1999 to November 18, 1999. Comments were received from a total of 478 agencies, organizations, and individuals. Note there is some overlap in comments since some respondents presented both written and oral comments.

| Comment Type | Meeting Date | Number of Commentors |
|-----------------------|---|----------------------|
| Oral Comments | June 9, 1999 | 50 |
| | July 20, August 17, Sept. 21, and October 19, 1999 meetings | 23 |
| | October 28, 1999 workshop | 10 |
| | November 17, 1999 hearing | 38 |
| Written comments | Agencies and organizations | 17 |
| | Individuals | 105 |
| | Signed duplicated postcard | 235 |
| Total received | | 478 |

Summary of Agency and Organization Comments Received

| General Position of Commenting Agency or Organization | Agencies and Organizations |
|---|--|
| Agencies and organizations offering general support of the proposed actions | CA Exotic Pest Plant Council CA Native Plant Society, Marin Chapter CA Native Plant Society, Milo Baker Chapter CA Native Plant Society, Yerba Buena Chapter Cultural Conservancy (Proposed Action in combination with Alt. 4) Fort Point and Presidio Historical Association (Proposed Action in combination with Alternative 4) Golden Gate Audubon Society National Parks Conservation Association Natural Resources Defense Council Sierra Club (Proposed Action in combination with Alternative 4) US Dept. of the Interior, Fish and Wildlife Service Urban Watershed Project |
| Agencies and organizations that provided comments with no stated support for an alternative | Dunes Guild Port of San Francisco |



| | |
|---|--|
| Organizations expressing serious concern with the preferred alternative | Lake Street Residents Association Neighborhood Associations for Presidio Planning Planning Association for the Richmond Presidio Heights Association of Neighbors West Presidio Neighborhood Association |
|---|--|

Summary of Preferences on VMP Alternatives. The preferences below provide a general sense of the magnitude of public preference for various plan elements.

| Preference | # of respondents |
|--|----------------------|
| Expressed general support of proposed actions (Alternative 1) | 52 |
| Expressed general support for proposed actions and Alternative 4 | 42 and 235 postcards |
| Expressed disapproval of plan elements or Disapproved of forest trees loss and/or restoration of native plant communities | 45 |
| Disapproved of the size limit of the Native Plant Communities Management Zone and/or want native habitat zone increased. | 14 |

Principal Issues Raised in Comments and Responses. As shown in the above table, “Summary of Preferences on VMP Alternatives,” most respondents expressed general support for the proposed actions, but there were several areas of concern regarding the future treatment of the forest and the relative amount of the Presidio devoted to management of each of the three vegetation categories. Concerns about the size of the zoned categories and the balance between the zones and the treatments proposed for each zone reflected the intrinsic and often conflicting values that individual viewers place on the cultural forest and native plant communities. These concerns include:

Preference for increased diversification of the historic forest by planting of native tree species. A significant number of respondents preferred Alternative 4 as the best means to rehabilitate and diversify the Presidio’s historic forest. Alternative 4 would devote more area to reestablishment of native plants using a more aggressive diversification or “change out” of the non-native forest plantation to native trees.

Preference for rehabilitation of the historic forest through increased planting of the four historically planted tree species. A contrasting view was also expressed by those who prefer the mature, even-aged character of the existing forest trees and groves to the more open landscape resulting from conversion to native coastal dune/scrub vegetation. Many respondents are Presidio neighbors who are concerned with the continuing loss of trees from storms, age and construction activities and wish to see more trees planted. The southwest corner of the Presidio is the major focus of much of this discussion because of its proximity to a residential neighborhood and the many changes that have recently occurred there.

Concern over loss of viewshed from neighboring residential areas. Tree height management along the Presidio perimeter and view-shed protection are serious concerns for neighboring residents. Maturing trees have grown to obstruct views of the Bay. Some neighbors have repeatedly topped offending trees at their own expense, and others wish to expand the practice to reclaim or create new views. The repeated topping of the trees is unsightly and requires high maintenance. This issue has been the focus of an ongoing dialog for a number of years, first with the U.S. Army and more recently the NPS and the Trust.

MODIFICATIONS TO THE SELECTED ALTERNATIVE

In response to public comments, Alternative 1, as defined in the VMP EA (1999), was modified to provide further clarification on the implementation process for the VMP. These and other modifications, set forth in more detail below, were presented and discussed before the GGNRA Advisory Commission at a public meeting on October 17, 2000.

Historic Forest Characterization and Treatment Study (Historic Forest Study). Alternative 1 was modified to respond to public concerns about implementation of the VMP altering the unique characteristics that comprise the historic forest of the Presidio if a broader range of native trees and shrubs were introduced into the forest management zone. Other members of the public strongly supported



diversifying the historic forest with native plants and shrubs. To address the concerns of both groups and to protect the integrity of the historic forest, the Historic Forest Study will be prepared to guide historic forest rehabilitation. The Historic Forest Study will determine the character-defining features of the historic forest that need to be preserved. The Historic Forest Study will determine to what degree the forest can be “diversified” and yet remain a contributing element to the Presidio’s status as a National Historic Landmark. The Historic Forest Study will be conducted by a qualified professional in conformance with the National Historic Preservation Act and the *Secretary of Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* and with concurrence by the State Historic Preservation Office. Future site-specific forest rehabilitation plans will rely on the treatment strategies developed in the Historic Forest Study to ensure that the qualities that define the historic forest are not diminished.

The basic elements of this Historic Forest Study are described in the VMP Proposed Management Actions for the historic forest zone and in the mitigation measure for the historic forest restoration in the GMPA EIS (1994b, p. 29). The VMP and GMPA recognize the need to rehabilitate the aging forest within the historic forest management zone and manage it to become more self-sustaining by increasing structural and species diversity and encouraging natural regeneration. The VMP identifies the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* as the appropriate standards to be applied in the selection of appropriate forest treatment. The Historic Forest Study will clarify the guidance in the VMP by providing a clearer definition of this important next step. The addition of the Historic Forest Study does not change the impact analysis in the EA, which concluded that the VMP would have a beneficial impact on the historic forest by rehabilitating and preserving historically significant forest stands and retaining the unique character of the forest. The Historic Forest Study will define the degree of diversity allowable to achieve the dual goals of protecting the cultural landscape and improving the natural values of the forest management zone.

Special Management Zone. Alternative 1 was also modified to reflect a change in the zoning designation of the southwest corner of the Presidio from native plant community and historic forest zones to a Special Management Zone (SMZ). The GMPA provides guidance on the scope of issues to be addressed in the VMP. However, the GMPA could not foretell the unforeseen and significant changes to the physical environment that have occurred in the southwest area since the 1994 adoption of the GMPA. Since that time, this area has been subject to the Richmond Transport Sewer construction project, slope failures, soil erosion and revegetation. Residents of the adjacent residential neighborhood have witnessed the changes to the physical setting and viewshed and are concerned that zoning would further affect their viewshed and local wind patterns. The southwest area also is presently the subject of a USFWS Recovery Plan (Coastal Plants of the Northern San Francisco Peninsula), exploring the potential for the area to provide habitat for a federally-listed endangered plant species, the San Francisco lessingia (*Lessingia germanorum*).

The modification of the Selected Alternative to include the southwest Special Management Zone will allow a separate planning effort for this area to take place once the USFWS Recovery Plan recommendations are finalized. The resource protection guidance from the USFWS Recovery Plan, input from agencies, and comments of the public and adjacent landowners will inform a future planning process that will convert the SMZ to appropriate vegetation zone designations. The SMZ designation does not change the assessment in the VMP EA (1999) but recognizes the delay in the release of the USFWS Recovery Plan and the need for the VMP to be responsive to the guidance in that plan. The SMZ designation does not limit or preclude future implementation of the VMP in this area but does delay the implementation until informed decisions on the protection of endangered species in the Presidio can be made. Identifying the SMZ is beneficial to the VMP as it allows the needed implementation of the VMP while reserving the decision for this one area until the USFWS Recovery Plan is released. Delaying adoption of the larger VMP until the USFWS Recovery Plan is released would delay rehabilitation and protection efforts in the remainder of the park and would produce no clear benefit to the resources.

Other Modifications to the Selected Alternative. The following modifications build on the protections afforded in the VMP EA (1999) or clarify guidance in that document regarding implementation of the VMP.



The recommendations do not change the impact assessment conclusions; rather these measures strengthen the conclusions in the VMP EA (1999).

- Down Wood. The VMP EA (1999) is revised to clarify the intent to enhance wildlife habitat through the use of down wood as appropriate in conjunction with comprehensive fire fuel management.
- Environmental Remediation Program. Environmental remediation activities will result in site-specific opportunities for VMP implementation. The revegetation components of projects under the Environmental Remediation Program will conform to the VMP zone map. If the revegetation is not consistent with the VMP, then the VMP zoning will be amended before implementation.
- Key Forest Stands. A pilot project will test intensive tree care strategies for mature trees within key historic forest stands to prolong the life of some of the more visible historic forest stands under the direction of a qualified urban forester.
- Minor VMP Zoning Map Edits. Three map edits were made to the Figure 3 in the VMP EA (1999). The areas are changed from native plant community to landscape zone because the areas are predominately landscape vegetation now and adjacent to or within developed parts of the Presidio.
- Photographic Simulations. Several series of photos depicting present conditions and simulating future conditions will be developed for various vegetation types in the Presidio to demonstrate the long-term visual and physical effect of VMP implementation.
- Replacement Plantings for the Hazardous Trees. The hazardous tree program will consider the need for replacement plantings when hazardous trees are removed.
- Site-Specific Pilot Programs. Small-scale, site-specific pilot programs will be developed. The pilot programs will vary in location and type of project focus concentrating on projects that can be initiated within the next one to three years. The plans for these site-specific programs will be developed by an interdisciplinary team and will be made available for public review and input prior to implementation and monitoring.
- Tennessee Hollow Restoration Project. Discussion of the Tennessee Hollow Restoration Plan has been added to the VMP EA (1999). This planning effort will determine the degree of restoration possible for the corridor. A minor map modification to Figure 3 in the VMP EA (1999) corrects the zoning in this corridor to show the connection of Tennessee Hollow to the Crissy Field marsh as directed by the GMPA.

ADOPTED MEASURES FOR ENVIRONMENTAL PROTECTION

The July 1999 VMP EA (pp. 74 – 75) contains text describing the range of measures, incorporated into the proposed action, that provide for environmental protection. These mitigation measures from the VMP EA have been reformatted into table form below, and are shown in a normal typeface. Additional measures noted in *Italics* in the table below were developed by the NPS and the Trust after consideration of public and agency comment. These additional measures clarify VMP implementation procedures. . The added measures strengthen the protection of park resources and the visitor experience during VMP implementation and support the success of VMP projects by expanding on steps required during project planning. All measures are incorporated into the Selected Alternative. In the table below, the measures are grouped by issue area along with a description of the potential environmental effect. The table below will appear in the revised Final EA replacing the text discussion of protection measures with the clearer structure of the table format.



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|---|--------------------|--|--|---|
| Potential impact on the unique character of the historic forest due to the introduction of a more diverse suite of tree and understory species could jeopardize the NHL Status of the Presidio (Mitigated by CU-1 and CU-2) | CU-1 – A Historic Forest Characterization and Treatment Study (HFCTS) shall be conducted by the National Park Service Olmsted Center for Landscape Preservation, or an affiliated group, to document, analyze and evaluate the characteristic features inherent in the historic forest and to develop a set of treatment recommendations consistent with the Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. This study shall explore whether and to what extent alternate tree species could be introduced into the zones of the historic forest without adversely affecting the unique cultural landscape and character of the historic forest as guided by the National Historic Preservation Act. CU-2 – Future site-specific implementation plans and forestry management practices shall follow the recommendations of the Historic Forest Study to the extent necessary to ensure that the characteristics and qualities that define the Presidio historic forest are protected. | Phase I | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Section 106 Process | Incorporate Historic Forest Study into VMP Implementation Strategy |
| The historic forest, including the key stands, has reached a mature stage and is in decline. Without active forest management, the decline will continue, and potentially impact the singular character of the forest. (Mitigated by CU-3 and CU-4) | CU-3 – The Historic Forest Study shall be prepared in a timely manner to allow for early identification of pilot projects and implementation strategies necessary to rehabilitate the historic forest's key stands. Forestry pilot projects, that both address the management of the historic forest's key stands and test these intensive tree care strategies shall be developed and implemented in a timely manner. CU-4 – All historic forest preservation efforts shall occur under the direction of a qualified urban forester. | Phase I | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Section 106 Process | Incorporate Historic Forest Study Recommendations into Pilot Projects |
| Rehabilitation and replacement of the landscape vegetation could result in a loss in the historic integrity of the cultural landscape (Mitigated by CU-5 and CU-6) | CU-5 – Prior to implementation of rehabilitation projects in the landscape vegetation zone, additional historic research (including site assessments and historic plant inventory), evaluation, and compatibility guidelines shall be prepared for specific sites to ensure compliance with the Secretary's Standards. CU-6 – The need to rehabilitate landscape vegetation shall be reduced by maximizing the use to the extent feasible and promoting the longevity of existing plant materials where they can meet program requirements. Use of existing plant material shall include salvaging and replanting existing vegetation, propagating Presidio plant stock from historic plant stock, and integrating core cultural landscape features (such as heritage trees) into site plans and designs. See also SUS-1. | Phases I, II & III | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Presidio Trust / NPS Grounds Maintenance Program | Require as Part of VMP Implementation Strategy |
| | | Phase II | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Section 106 Process | Incorporate Guidelines into Rehabilitation Projects |
| | | Phases I & II | Presidio Trust / NPS Historic Landscape Architect | Presidio Trust and NPS Leasing Program | Require in Site Planning |



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|--|---|---|---|--|
| <p>Disturbance and changes to the cultural landscape could affect contributing elements of the Presidio National Historic Landmark District. (Avoided by CU-7 and CU-8)</p> | <p>CU-7 – In accordance with the governing Programmatic Agreement under Section 106 of the NHPA, the following conditions shall apply to the implementation of the VMP.</p> <p>a. All actions and projects that involve ground disturbance and changes to the cultural landscape implemented under the VMP shall be certified by historic preservation personnel through the applicable PA for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties according to the requirements of the applicable PA for that action or project.</p> <p>b. Action and projects that involve ground disturbance shall be subject to the provisions of the PA addressing archeological monitoring and the process followed if unexpected archeological resources are uncovered.</p> <p>c. Consistent with the findings of the Historic Forest Study (see CR-1), any substitute species considered for planting in the historic forest (for example, other species of cypress or eucalyptus of lower stature) or in historic landscape areas shall be tested through pilot projects to assess the ability to survive site conditions and evaluated as to its physical appearance and characteristics.</p> <p>CU-8 – Hazardous trees within the historic forest shall be documented under procedures outlined in the appropriate Landscape Preservation Maintenance Plan before removal. Sound forestry criteria for pruning all trees will be developed concurrently with planning for hazardous tree abatement.</p> | <p>Phases I, II & III</p> | <p>Presidio Trust VMP Project Manager / NPS VMP Program Manager</p> | <p>Section 106 Process</p> | <p>Require as Part of VMP Implementation Strategy</p> |
| <p>Conformance of Environmental Remediation Program with VMP treatments (Mitigated by ER-1)</p> | <p>ER-1 – Vegetation treatments that occur in conjunction with the Environmental Remediation Program for the Presidio shall conform to the VMP zoning map, and shall be subject to site-specific planning and environmental review prior to implementation.</p> | <p>Phases I, II & III</p> | <p>Presidio Trust Forester</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Require as Part of VMP Implementation Strategy</p> |
| <p>Potential erosion due to surface disturbance and change to existing ground cover (Mitigated by SO-1)</p> | <p>SO-1 – Projects that disturb soil and groundcover vegetation shall minimize soil erosion by complying with the following best management practices (BMPs):</p> <ul style="list-style-type: none"> • Stumps shall be left and cut at ground level in erosive soils and erosion control measures shall be taken to reduce compaction, reduce the size of area disturbed, and stabilize soils with approved erosion control techniques including blankets, netting, wattles and straw when needed. • Unless there are no feasible alternatives, the use of heavy equipment shall be avoided in areas where soils are wet and in areas where compaction could occur that would cause significant soil damage. • Disturbed soils shall be returned to a stable condition by | <p>During Environmental Remediation Program</p> | <p>Presidio Trust Environmental Remediation Program Manager / NPS Environmental Remediation Personnel</p> | <p>Presidio Trust Remediation Program</p> | <p>Incorporate into Presidio Trust Environmental Remediation Program</p> |
| <p>Potential erosion due to surface disturbance and change to existing ground cover (Mitigated by SO-1)</p> | <p>SO-1 – Projects that disturb soil and groundcover vegetation shall minimize soil erosion by complying with the following best management practices (BMPs):</p> <ul style="list-style-type: none"> • Stumps shall be left and cut at ground level in erosive soils and erosion control measures shall be taken to reduce compaction, reduce the size of area disturbed, and stabilize soils with approved erosion control techniques including blankets, netting, wattles and straw when needed. • Unless there are no feasible alternatives, the use of heavy equipment shall be avoided in areas where soils are wet and in areas where compaction could occur that would cause significant soil damage. • Disturbed soils shall be returned to a stable condition by | <p>Phases I, II & III</p> | <p>Presidio Trust VMP Project Manager / NPS VMP Program Manager</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate BMPs into Implementation Plans</p> |

⁵ The VMP zoning map can be amended with appropriate NEPA review



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|--|-----------------|---|--|---|
| | <p>ensuring installation of appropriate erosion control measures and by replanting in the native plant community and historic forest areas consistent with the VMP zones.</p> <ul style="list-style-type: none"> Site grading and drainage plans shall include drainage design measures that promote groundwater percolation through soil decompaction and use of permeable ground cover. <p>FM-1 – The effectiveness of the forest rehabilitation efforts shall be monitored annually, and evaluated every 5 years to consider: changes in the number and size of windthrow areas; progress in moving toward more uneven-aged stands; experience gained from active management of the Presidio forest as well as experiences of other land managers of similar forests; and past and estimated future costs of forest maintenance. The findings shall be used to determine whether changes to forestry strategies, treatments and management will be required.</p> <p>FM-2 – Monitoring of historic forest conditions shall be undertaken to collect data such as soil types, site conditions and seed release and dispersal factors, in order to increase the potential for voluntary reseedling of tree species. See also CR-1 – CR-4.</p> <p>FM-3 – Periodic monitoring and seasonal inspection of selected forest stands shall be conducted to detect disease and pest problems at an early stage. An integrated pest management plan shall be developed if monitoring indicates the presence of the pine pitch canker (a fungus), the eucalyptus longhorn borer, or other known pests and diseases in the Presidio.</p> <p>FM-4 – Forest fuel loads shall be frequently inspected, and shall be altered when necessary by removing dead and fallen trees and branches, pruning trees to remove dead branches that can act as a fuel ladder, and removing excessive forest litter. Clearing or mowing of understory vegetation shall occur in areas that are frequently visited when necessary to reduce fire hazard.</p> <p>LU-1 – Public involvement and plan review shall be incorporated into site-specific planning for projects adjacent to residential boundaries. Modifications to projects in response to concerns raised by adjacent communities shall be considered as part of the project planning and design.</p> | Phases II & III | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Presidio Trust / NPS Grounds Maintenance Program | Incorporate Findings into Annual Forestry Workplan |
| Potential impacts on forest health due to infection from pests and diseases (Mitigated by FM-3) | | Phase II | Presidio Trust Forester | Presidio Trust / NPS Grounds Maintenance Program | Incorporate Findings into Annual Forestry Workplan |
| Potential impact of increased wild fire hazard as the result of high fire fuel loads (Mitigated by FM-4) | | When Required | Presidio Trust Forester and Presidio Trust / NPS Integrated Pest Management Specialists | Presidio Trust / NPS Grounds Maintenance Program | Incorporate Monitoring into Annual Forestry Workplan |
| Potential impacts of changed viewshed and wind patterns due to VMP projects within historic forest and native plant communities (Mitigated by LU-1 –LU-3) | | All Phases | Presidio Trust Forester and NPS Fire Management Personnel. | Presidio Trust / NPS Grounds Maintenance Program | Incorporate Monitoring into Annual Forestry Workplan |
| | | Phase II | Presidio Trust VMP Project Manager / NPS VMP Program Manager | Presidio Trust and NPS NEPA Compliance Processes | Incorporate Public Involvement into Project Planning and Design |



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|--|----------------------------|---|---|---|
| | <p>LU-2 – The size and configuration of forest openings shall depend largely on the effects of storms, but when storm-damaged trees are cleared to prepare a site for rehabilitation, the effect of wind on regeneration success and windbreak functions shall be considered. Clearings will generally be oriented perpendicular to the prevailing wind in a southwest-northeast pattern. See also NO-2, NO-3, PP-1, and VR-1 – VR-5.</p> <p>LU-3 -- Where practicable, conduct an analysis of the potential changes to both the local wind patterns and forest windbreak integrity that could occur as the result of tree removal activities prior to project implementation. Incorporate findings into project design.</p> | <p>Phase II</p> | <p>Presidio Trust Forester</p> | <p>Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Require as Part of VMP Implementation Strategy</p> |
| <p>Potential impacts on native plant communities due to the spread of invasive exotic plant species (Mitigated by NP-1)</p> | <p>NP-1 – The following strategies shall be employed to control the spread of invasive exotic plants in the Presidio:</p> <ul style="list-style-type: none"> ▪ A list of approved plant material for horticultural use shall be developed, and periodically revised, in planting plans. ▪ Integrated pest management practices shall be used to control and/or remove targeted invasive exotic species threatening sensitive native habitat. ▪ Tests shall be conducted to evaluate the most ecological and cost effective methods for controlling and/or removing targeted invasive exotic species. | <p>Phases I & II</p> | <p>Presidio Trust Forester and VMP Project Manager/ NPS VMP Program Manager</p> | <p>Presidio Trust and NPS Compliance Processes</p> | <p>Require as Part of VMP Implementation Strategy</p> |
| <p>Potential impacts on native plant communities, due to VMP-related activities, which could accelerate erosion, change surface hydrology or remove vegetation (Mitigated by NP-2 – NP-6)</p> | <p>NP-2 – Systematic monitoring shall occur to evaluate the success of the native plant community restoration projects. Monitoring results shall be used to document population and species composition changes and provide a baseline for measuring the effectiveness of enhancement and restoration efforts as they are implemented. If negative trends occur, the project would be carefully reviewed and further actions would cease. The project would be revised to determine the necessary corrective action. Annual monitoring activities shall include:</p> <ul style="list-style-type: none"> ▪ Photo documentation of the pre-project condition, restoration activities and annual photo points. ▪ Continuation of regular qualitative evaluation of most existing native plant communities. ▪ Establishment of permanent quantitative transects in reference areas and restored habitat. ▪ Establishment and/or modification of protocols necessary for assessing the development of re-created native plant communities. ▪ Annual censusing and/or range mapping of all thirteen special status plant species and any other special status species that may occur in the future. | <p>All Phases</p> | <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> | <p>Presidio Park Stewardship Program</p> | <p>Incorporate Strategies into Implementation Plans</p> |
| | | <p>Phases II & III</p> | <p>Presidio Trust Natural Resources Program Manager and NPS VMP Program Manager</p> | <p>Presidio Park Stewardship Program</p> | <p>Incorporate Monitoring into Implementation Plans</p> |

⁶This mitigation measure was omitted from previous versions of this table and subsequently added on 11/07/01 upon the concurrence of all signatories.



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|--|------------|---|--|---|
| | <p>NP-3 – Native plant material shall be salvaged to the greatest extent feasible, as directed by a qualified restoration specialist, prior to tree removal activities within both the native plant communities and historic forest zones.</p> | All Phases | Presidio Trust Natural Resources Manager and NPS VMP Program Manager | Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance Program | Require as Part of VMP Implementation Strategy |
| | <p>NP-4 – Heavy equipment use shall be scheduled, to the greatest extent feasible, to avoid areas where soils are wet and prone to compaction.</p> | All Phases | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance Program | Incorporate Condition into Implementation Plans |
| | <p>NP-5 – Existing vegetation shall be fenced, if deemed appropriate by a qualified restoration specialist, to prevent accidental incursions during VMP project implementation. An education strategy for work crews shall be conducted onsite, to include training in plant and sensitive resource identification.</p> | Phase II | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |
| | <p>NP-6 – All native plants shall be grown from existing Presidio genetic stock propagated at the Presidio-based nursery or in accordance with established practices within the Nursery System Standard Operating Procedures. If no on-site seeds or cuttings are available, documentation of the justification for the reintroduction decision shall be prepared, and an evaluation shall be conducted to determine the most appropriate off-site source for reintroduction. Temporary fencing, to prevent visitors on the trail and overlooks from disturbing existing and newly planted habitat areas after construction, shall be installed where necessary.</p> | Phase II | Presidio Trust Natural Resources Manager and NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |
| <p>Potential impacts on native plant communities due to the spread of the historic forest beyond the historical boundaries (Mitigated by NP-7 and NP-8)</p> | <p>NP-7 – Temporary fencing shall be installed to protect native plant communities, as necessary, when removing stands of invasive trees outside of the historic forest, or as needed for forest diversification. Disturbance will be limited to areas prescribed by the fencing.</p> | Phase II | Presidio Trust Natural Resources Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |
| | <p>NP-8 – To reduce the workload needed to contain the spread of forest species and increase the diversity of forest species, transition and buffer areas shall be established where historic forest plantings about native plant communities. Buffers shall not be established on the perimeters of key historic forest stands to avoid altering their historic character. Site-specific planting plans for buffer areas shall be guided by both the Historic Forest Study and ecological restoration action plans.</p> | Phase II | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Park Stewardship Program | Incorporate Condition into Implementation Plans |



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|---|--|---|---|--|
| <p>Ensure protection of rare and endangered species (Mitigated by NP-9 – 11)</p> | <p>NP-9 – The southwest corner of the Presidio in Area A is designated as a Special Management Zone (SMZ) for future planning pending the forthcoming U.S. Fish and Wildlife Service (USFWS) Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula. The USFWS Recovery Plan will recommend areas of the Presidio, including the SMZ, that could provide habitat critical for the long-term recovery of the San Francisco lessingia, a federally-listed endangered species. During NEPA review of the VMP, public comment indicated a range of issues for consideration in future planning of the SMZ. These issues include effects on viewshed, wind patterns, noise, native plant restoration, historic forest, rare plant species and wildlife habitat. SMZ planning will proceed when the USFWS Recovery Plan is finalized. At that time, an interdisciplinary group, comprised of resource experts and interested public, will work in a collaborative setting to develop the vegetation zoning emphasis: ~ 00@0000@fl Definitio</p> <p>NP-10 – Monitoring of all known special-status species populations shall be conducted annually until the natural variation in population size is well documented; after that, monitoring shall be conducted at least once every 3 years. If declining trends are observed, then consultation with USFWS to develop corrective management actions shall occur.</p> <p>NP-11 – The Section 7 consultation process shall be followed for all management actions for federally-listed species.</p> | <p>on Completion of the USFWS Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula</p> <p>Phases I, II & III</p> <p>Phases I, II & III</p> | <p>Presidio Trust VMP Project Manager, Natural Resources Program Manager and Forester / NPS VMP Program Manager and Natural Resource Specialist</p> <p>Presidio Trust Natural Resources Program Manager / NPS Natural Resource Specialist</p> <p>Presidio Trust Natural Resources Program Manager / NPS Natural Resources Division Chief and Natural Resource Specialist</p> <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> | <p>USFWS Section 7 Consultation Process</p> <p>USFWS Section 7 Consultation Process</p> <p>USFWS Section 7 Consultation Process</p> <p>Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance Program</p> | <p>Incorporate Critical Habitat into Implementation Plan for SMZ</p> <p>Incorporate Monitoring and Management Actions into Annual Workplan</p> <p>Require as Part of VMP Implementation Strategy</p> <p>Incorporate Noise Provisions into Implementation Plans</p> |
| <p>Potential impact to visitors and residents due to noise generated from power equipment associated with VMP projects (Mitigated by NO-1-3)</p> | <p>NO-1 – Work areas will be temporarily closed to the public when loud machinery is in operation to avoid exposing visitors to high noise levels.</p> <p>NO-2 – Tasks that generate high noise levels, such as wood chipping, will be conducted at less intrusive areas or moved offsite whenever feasible.</p> <p>NO-3 – Activities that generate high noise levels will be limited to daylight and weekday hours and will be scheduled to minimize noise impacts for visitors and residents.</p> | <p>During Demolition and Construction</p> | | | |



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|--|---|--|---|--|
| Ensure effectiveness of Pilot Project Programs (Mitigated by PP-1) | <p>PP-1 – Site-specific pilot programs shall be developed and implemented over the next 5-8 years to test and assess the effectiveness of restoration and forestry techniques, and monitor results and performance. Results of the pilot projects shall be used to inform future VMP implementation actions. Pilot projects shall conform to the following:</p> <ul style="list-style-type: none"> ▪ Pilot programs shall be small in scale, varied in location (but generally in less visible areas), and representative of a variety of options for historic forest treatment and native plant community restoration. ▪ Plans for site-specific programs shall be developed through careful site evaluation and biological assessment by an interdisciplinary team. ▪ Site-specific restoration projects shall be subject to NEPA review prior to implementation. ▪ A monitoring analysis, post-construction evaluation and documentation program shall be conducted for each pilot project thereby providing analysis and information to guide the implementation of future projects. | Phase I | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Trust and NPS NEPA Compliance Processes | Incorporate Conditions into Pilot Projects |
| Potential impacts to volunteer programs and interpretive opportunities as the result of VMP implementation activities (Mitigated by RV-1 – RV-3) | <p>RV-1 – Education, interpretation and public relations programs would be developed and publicized to convey the reasons for the VMP projects.</p> <p>RV-2 – The Presidio Park Stewardship Program and future stewardship programs shall be continued collaboratively between the NPS and Presidio Trust to provide interpretive experiences and volunteer opportunities for the community.</p> <p>RV-3 – The Presidio Trails and Bikeways Master Plan shall conform to guidance of the VMP.</p> | Phase II | Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager | Presidio Trust / NPS Public Education, Interpretation and Public Relations Programs | Require as Part of VMP Implementation Strategy |
| Potential hazards presented to visitors through tree fall or limb breakage (Mitigated by SA-1) | <p>SA-1 – Hazardous trees that pose direct and unavoidable threats to human health and safety shall be removed following consideration of measures W1 1-3. Hazardous tree reports shall be reviewed annually to determine the need for replacement plantings. The ratio used for replacement plantings shall depend on site-specific conditions such as the level of natural regeneration in the area, effects on visitor experience, and screening requirements.</p> <p>SA-2 – Implementation activities could pose hazards to the public if uncontrolled access is permitted in VMP project areas during implementation. During implementation, the project area, including the portions of any adjacent trail systems and</p> | Phases I, II & III | Presidio Trust Natural Resources Program Manager / NPS Natural Resource Specialist | Presidio Trust Parkwide Improvements Program | Require as Part of VMP Implementation Strategy |
| Potential for hazards to visitors from VMP implementation activities (Mitigated by SA-2) | | Construction of Presidio Trails and Bikeways Plan | NPS VMP Program Manager | NPS NEPA Compliance Process | Incorporate into Presidio Trails and Bikeways Plan |
| | | Phases I, II & III | Presidio Trust Forester | Presidio Trust / NPS Grounds Maintenance Program | Incorporate into Annual Forestry Workplan |
| | | Phase II | Presidio Trust Forester | Presidio Trust / NPS Grounds Maintenance | Incorporate Condition into Implementation Plans |



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|--|---|---|--|--|---|
| <p>Potential interim impacts to visitor experience, due to changed visual effects and landscape features during tree removal and vegetation clearing activities (Mitigated by VS-1 – VS-5)</p> <p>Implementation of the VMP could result in an increased demand for scarce resources and generate increased solid waste (SU-1 – SU-3).</p> | <p>recreational resources, shall be fenced and closed to the public.</p> <p>VS-1 – Reforestation of forestry project areas shall occur as soon after clearing of the dead and down trees as possible (when feasible, within one year). Temporary irrigation shall be installed to ensure the survivorship of saplings.</p> <p>VS-2 – Revegetation of restoration project areas with native plants shall be completed as expeditiously as resources permit. If revegetation takes more than one year, an exotic species control strategy shall be implemented to prevent the establishment of invasive exotic weeds.</p> <p>VS-3 – Forestry rehabilitation areas that require tree removal within the historic forest shall be restricted to a size of less than ½-acre to minimize visual impacts, unless otherwise approved.</p> <p>VS-4 – Photographic simulations shall be developed for a repertoire of typical vegetation management projects to serve as examples of proposed forest rehabilitation and native plant restoration treatments.</p> <p>VS-5 – The selection of projects for annual workplans shall take into account the cumulative effect of individual projects on the overall scenic resources and visitor experience of the park. Steps shall be taken to disperse the implementation activities throughout the park whenever possible, so as not to overwhelm any one area with dramatic changes. See also SO-1(a), SA-1 and NR-10.</p> | <p>Phase II</p> <p>Phase II</p> <p>Phase II</p> <p>Phase II</p> <p>Phases I & II</p> <p>Phase II</p> <p>Phase II</p> <p>Phase II</p> <p>Phase II</p> <p>Ongoing</p> | <p>Presidio Trust Forester</p> <p>Presidio Trust Natural Resources Program Manager / NPS VMP Program Manager</p> <p>Presidio Trust Forester</p> <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> <p>Presidio Trust VMP Project Manager and Forester / NPS VMP Program Manager</p> <p>Presidio Trust / NPS Landscape Architects</p> <p>Presidio Trust / NPS Landscape Architects</p> <p>Presidio Trust Sustainability Coordinator</p> | <p>Program</p> <p>Presidio Trust / NPS Grounds Maintenance Program</p> <p>Presidio Park Stewardship Program</p> <p>Presidio Trust / NPS Grounds Maintenance Program</p> <p>Presidio Park Stewardship Program</p> <p>Presidio Park Stewardship Program</p> <p>Presidio Trust and NPS Leasing Program</p> <p>Presidio Park Stewardship Program and NPS Leasing Programs</p> <p>Presidio Trust Sustainability Program</p> | <p>Incorporate Condition into Implementation Plans</p> <p>Incorporate Condition into Implementation Plans</p> <p>Incorporate Condition into Implementation Plans</p> <p>Incorporate Simulations into Implementation Plans</p> <p>Incorporate into Annual Workplan</p> <p>Require in Site Planning</p> <p>Incorporate Measures into Implementation Plans</p> <p>Incorporate into Presidio Trust Sustainability Program</p> |
| | <p>SU-1 – The selection of landscape plants shall consider sustainability criteria including disease and pest resistance, drought-tolerance, suitability to the site's microclimate, and the degree of care required to reduce demands for energy and intensive ongoing maintenance.</p> <p>SU-2 – Water conservation measures shall be factored into the planning, design and on-going maintenance of landscaped areas, including the establishment period for reforestation areas and native plant restoration sites.</p> <p>SU-3 – Sustainable green waste and composting facilities shall be increased and/or developed to ensure that organic debris is recycled and reused as much as possible within the Presidio.</p> | <p>SU-1 – The selection of landscape plants shall consider sustainability criteria including disease and pest resistance, drought-tolerance, suitability to the site's microclimate, and the degree of care required to reduce demands for energy and intensive ongoing maintenance.</p> <p>SU-2 – Water conservation measures shall be factored into the planning, design and on-going maintenance of landscaped areas, including the establishment period for reforestation areas and native plant restoration sites.</p> <p>SU-3 – Sustainable green waste and composting facilities shall be increased and/or developed to ensure that organic debris is recycled and reused as much as possible within the Presidio.</p> | | | |



| POTENTIAL IMPACT OR EFFECT | MITIGATION MEASURES | PHASE | RESPONSIBILITY FOR COMPLIANCE | METHOD | ENFORCEMENT |
|---|---|----------|---|---|--|
| <p>Potential impacts to wildlife habitat due to VMP project activities (Mitigated by WI-1 – WI-5)</p> | <p>WI-1 – With the exception of unanticipated events requiring hazardous tree abatement, vegetation removal activities or activities using loud power or mechanical equipment will be scheduled outside of the annual bird-breeding season (currently March 1st to August 15th).</p> | Phase II | Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist | Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs | Incorporate Measures into Implementation Plans |
| | <p>WI-2 – To reduce effects on wildlife and wildlife habitat, work areas will be delineated with habitat fencing, where necessary, and work crews shall be trained to minimize effects to habitat values.</p> | Phase II | Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist | Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs | Incorporate Measures into Implementation Plans |
| | <p>WI-3 – Any removal of vegetation shall follow adopted guidelines for protection of nesting birds. These guidelines include restrictions on timing of vegetation removal and requirements for searching for nests prior to removal if activities can not be delayed. Unanticipated events requiring hazard tree abatement shall be conducted when necessary outside of the restrictive timelines, and conform to measures SA-1 and SA-2. Restriction of work areas and education of work crews may also be used to reduce possible wildlife impacts.</p> | Phase II | Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist | Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs | Incorporate Measures into Implementation Plans |
| | <p>WI-4 – Prior to tree removal, each work site shall be evaluated by a qualified biologist to determine whether any element of the forest or the proposed restoration site provides habitat for any special status species. Measures shall be developed for avoiding any elements identified. If avoidance is infeasible, consultation would be completed consistent with Measure NP-11. Non-native forest stands with high wildlife values shall generally be retained, unless they will be replaced incrementally with rare native plant communities, such as serpentine communities, or native plant communities that also have high wildlife value, such as coast live oak or willow riparian plant communities or forest stands with greater wildlife value consistent with the HFCTS treatments.</p> | Phase II | Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist | Presidio Park Stewardship Program and Presidio Trust / NPS Grounds Maintenance and Leasing Programs | Incorporate Measures into Implementation Plans |
| | <p>WI-5 – Areas within the forest management zone shall be evaluated to determine where standing dead or downed limbs and trees will be allowed to decompose naturally to enhance wildlife habitat providing they neither harbor pests or diseases that can affect other Presidio resources, nor create a fire hazard, nor conflict with the Historic Forest Study treatments.</p> | Phase II | Presidio Trust Forester and Natural Resource Program Manager / NPS Wildlife Biologist | Presidio Trust / NPS Grounds Maintenance Programs | Incorporate Measures into Implementation Plans |



BASIS FOR THE DECISION

The Selected Alternative best accomplishes the purpose and need for the VMP -- to protect the integrity of and rehabilitate the historic forest, the cultural landscape, and historic scenic vistas, and to enhance native plant communities and protect special status plant species. The Selected Alternative gradually replaces forest stands where storms, hazardous tree removal, and fallen trees provide openings in the canopy. The Selected Alternative provides for the consideration of planting native trees and shrubs within the historic forest zone, but ensures that the three historically planted tree species would continue to dominate the historic forest management zone. These revegetated areas will enhance wildlife values by the gradual change of much of the historic forest from monotypic, single-aged stands to more mixed species and mixed-aged stands. The forest will be gradually reduced over time to the area of the historic forest zone by cutting small outlying stands of 0.3 to 0.5 acres at a time. The Selected Alternative proscribes the type and number of native trees and shrubs that could be introduced to the historic forest and assures protection of the integrity of the cultural landscape and viewshed while improving natural values, wildlife habitat, stewardship opportunities and reducing maintenance requirements. The Selected Alternative reflects public concerns regarding the integrity of the historic forest and public support for expansion of native trees and shrubs in the Presidio. The ongoing rehabilitation of the historic forest in conjunction with a gradual introduction of native species is a strategy that responds to the comments of adjacent homeowners who expressed concern about changes to the Presidio viewshed.

Alternative 3 provides for the rehabilitation and replanting of the historic forest in block cuts of 0.5 to 0.75 acres distributed throughout the historic forest area. Alternative 3 was not chosen as the selected alternative for several reasons. First, Alternative 3 would not provide the flexibility requested by the public to study and alter the range of tree and shrub species in the historic forest. Second, larger forest cuts are allowed under Alternative 3, which would result in more wildlife disruption. Wildlife habitat is improved over the long-term by some increase in multi-storied, multi-aged forest stands and understory vegetation, but not to the full extent provided in the Selected Alternative. Alternative 3 calls for greater changes in viewshed both within and from outside the park.

Under Alternative 4, tree and understory replacement plantings will occur gradually as fallen trees and storm events provide openings and opportunities but a variety of California native tree species and other tree species would be introduced as replacements for the three tree species that currently dominate the forest. Implementation of Alternative 4 enhances habitat values and provides additional replacement options in the event of disease outbreaks that could threaten one or more of the three dominant species. Alternative 4 received support from many respondents during the public review, and the NPS and the Trust considered the advantages of Alternative 4 when developing the Selected Alternative. Alternative 4 was not designated the Selected Alternative as the introduction of a wide range of tree species would substantially alter the character of the historic forest, a contributing element to the National Historic Landmark status of the Presidio. The character of the historic forest is defined in part by the form, scale, and appearance of the historic forest that remains today -- i.e. a continuous canopy forest, the three dominant tree species, and the regimental appearance of the key forest stands. It is recognized that the Historic Forest Study, required in the Selected Alternative, will address to what extent the expanded list of tree species called for in Alternative 4 can be incorporated into rehabilitation efforts in the historic forest zone.

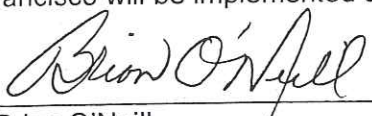
The No Action Alternative (Alternative 2) does not provide the level of protection necessary to meet the legal obligations of the NPS and the Trust to protect the significant natural, historic, scenic, cultural and recreational values of the park. The No Action Alternative does not conform to GMPA management directives requiring proactive rehabilitation, enhancement, inventorying, and monitoring of the vegetation resources within the park. The No Action Alternative would not correct existing safety conditions through a hazard tree program; it would not protect the unique characteristics that comprise the historic forest, nor correct existing erosion problems. The No Action Alternative does not provide sufficient protections for existing native plant communities or special-status plants, nor does it systematically address protection of wildlife habitats or control of invasive exotic plant species.

The impacts resulting from the implementation of the VMP Selected Alternative will not impair any park resource or value necessary to fulfill the specific purposes identified in the enabling legislation for Golden Gate National Recreation Area (16 USC 460). The effects documented in the Final VMP EA and summarized in this FONSI will not affect resources or values key to the natural or cultural integrity of the park or alter opportunities for enjoyment of the park. This alternative, with the incorporated measures for environmental protections for environmental protection, will not violate the NPS Organic Act (16 USC 1 et seq.) or the Trust Act (16 U.S.C. 460bb appendix). The Selected Alternative also complies with the Endangered Species Act, the National Historic Preservation Act, and Executive Orders 11988 and 11990.

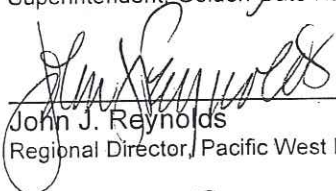
FINDING

In response to public comments received, the NPS and the Trust have further considered the range of alternatives, the significance of potential impacts that may be generated by the Selected Alternative, and the possible need to prepare a site-specific Environmental Impact Statement (EIS) for the Selected Alternative. This alternative best accomplishes the overall vegetation management of the park in keeping with the legislated purposes and the legal mandates of the NPS and the Trust. Based on this detailed review, the NPS and the Trust conclude that appropriate alternatives to the Selected Alternative have been analyzed, and that the proposal will not generate any significant new or different environmental impacts requiring preparation of an EIS.

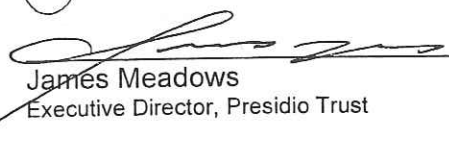
In conclusion, the VMP does not constitute an action that would normally require the preparation of an EIS. It is tiered off of and is consistent with the GMPA/EIS. The proposal will not have a significant impact on the human environment. There are no significant impacts on public health, public safety, threatened or endangered species, sites listed on the National Register of Historic Places, or other unique characteristics of the region. Implementation of the action will not violate any federal, state, or local law. Therefore, in accordance with the National Environmental Policy Act of 1969 and regulations of the Council on Environmental Quality (40 CFR 1508.9), the Selected Alternative to the Vegetation Management Plan for the Presidio of San Francisco will be implemented and an environmental impact statement will not be prepared.

Recommended: 
Brian O'Neill
Superintendent, Golden Gate National Recreation Area

August 23, 2001
Date

Approved: 
John J. Reynolds
Regional Director, Pacific West Region, NPS

9.6.01
Date


James Meadows
Executive Director, Presidio Trust

8.24.01
Date

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